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ABSTRACT

Included in this document are the addresses and proceedings of the 40th National and 7th International Annual Conference of the American Industrial Arts Association. The proceedings are organized by the following subject groups: career education, curriculum, drafting, electricity/electronics, elementary school industrial arts, energy, evaluation, futurology, graphic communications, individualized instruction, international perspective, leisure, manufacturing, metrics, miscellaneous instruction areas, plastics, public relations, publications, research, safety, special needs programs, state and local organizations, student groups, teacher education, teaching aids, teaching methods, technology, theory, transportation, wood, and association business. (BM)

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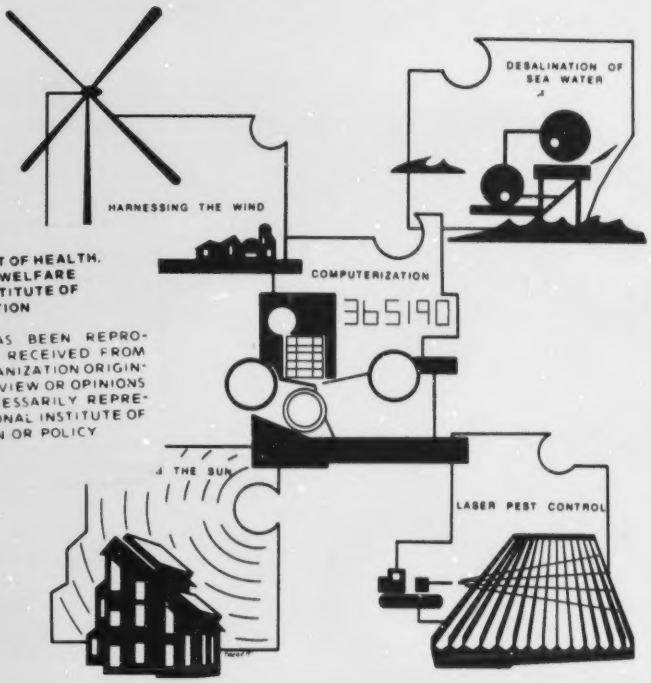
Industrial Arts:

"Youth's Gateway to the Future"



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Addresses and Proceedings of the 40th National and 7th International Annual Conference of the American Industrial Arts Association, Atlanta, Ga., February 27–March 3, 1978.

Donald L. Rathbun, executive director
Jeni M. Salassi, coordinator of publications
Cecile B. O'Marr, publications assistant
American Industrial Arts Association
Washington, D.C.

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ACESIA—American Council for Elementary School Industrial Arts

ACIAS—American Council of Industrial Arts Supervisors

ACIASAO—American Council of Industrial Arts State Association Officers

ACIATE—American Council on Industrial Arts Teacher Education

Table of Contents

Past Presidents of the American Industrial Arts Association .. vi

AIAA and COUNCIL SPECIAL INTEREST SESSIONS BY SUBJECT GROUPS

CAREER EDUCATION

Focusing Industrial Arts on Career Education, H. Bert DiPaul 2

Industrial Arts in Career Education, James Hales, William R. Thompson 4

The Utah Industrial Arts Career Exploration Program, LaVoy Starley, Lee Abraham 6

CURRICULUM

The Industrial Arts Curriculum K-12 **(ACIAS)**, Thomas A. Hughes Jr. 9

An Instructional Plan for Technology Education in Wetzel County, West Virginia, K-12, Samuel L. Cole, Fred E. Fox, Richard E. Peterson, Don W. Shepard 11

Industrial Arts as a Liberal Arts Course in College, Thomas J. Morrisey 13

A Model for Curriculum Development, John M. Ritz 15

Statewide Curriculum Articulation, Tom Ryerson, Marson Rinkenberger 17

Integrative Instructional Approaches for Industrial Arts Courses, Earl E. Smith 19

A Case Study of Curriculum, Facilities and Methodology Innovation in Industrial Arts Teacher Education at Bowling Green State University, Jerry Streichler 21

A Model Home Maintenance and Repair Curriculum Guide for High School Boys and Girls, Eugene C. Sherrell 23

DRAFTING

The ABC's of Drafting, Charles W. Bohr 26

ELECTRICITY/ELECTRONICS

Alternatives to the High Cost of Electronics Laboratory Training Equipment, R. Dan Brook 29

Analogies Useful in Explaining Solid State Device Theory, Robert F. Dorner 31
Curriculum Development in Electricity and Electronics, William E. Dugger Jr., Dale R. Patrick 33

ELEMENTARY SCHOOL i.A.
Elementary Industrial Arts: A Practicum Experience in Teacher Education, Jack W. Wescott 36

ENERGY
Wind Energy Conversion Systems—A Component of a Course of Study in Power Production Systems, Martin Greenwald 39
Solar Energy Curriculum, James E. O'Bannon 41
Energy-Environment Simulator, Douglas L. Polette 43
Energy Education in Industrial Arts, John W. Sinn 45
Instructional Strategies in Energy Technology, A. E. Schwaller 47

EVALUATION
Formative Evaluation: A Model for Instructional Material Development and Revision in Industrial Arts Education, Marvin I. Sarapin 50
Students Evaluate the Classroom Teacher **(ACIAS)**, John E. Bonfadini 52
Evaluating Industrial Arts Programs, W. J. Haynie III 54

FUTUROLOGY
The Thematic Approach: A Procedure for Revising Industrial Arts Undergraduate Programs for the Future, Everett N. Israel 57
Futures Workshop **(ACIATE)**, Gary E. Lintereur 59
Designing Industrial Arts/Technology Facilities for the Future, Myron Bender 61
Perspectives on the Future: Industrial Arts Plays a Key Role in Future Education, Donald Maley 63
How to Become a Futurist, Gary E. Lintereur, Lee H. Smalley 65
Learning for Tomorrow: Youth's Gateway to the Future, Kendall N. Starkweather 67

GRAPHIC COMMUNICATIONS
Airbrush Rendering, Wandel L. Dye 70
Graphic Communication, Claude A. Bell 72
PICA Graphic Communication Education Program, J. Page Crouch 74
Calligraphy in Graphic Communications, Robert G. Hostetter 76
Graphic Communication Techniques: Curriculum, Activities and Requisitions, H. Terry Leeper 78

INDIVIDUALIZED INSTRUCTION
Let's Make an I. M., Michael R. Kozak 81

INTERNATIONAL PERSPECTIVE
Industrial Education/Training in Saudi Arabia—Occupationally Oriented, Competency Based, Individualized Instruction, Clifton P. Campbell, Abdullah H. Bukhary 84
Industrial Arts Education Teacher Preparation in Taiwan, Tien-Jin (Frank) Chang 86

LEISURE
In Pursuit of Leisure in a Technological Society, Frank R. Trocki 89

MANUFACTURING
Composites Manufacturing Technology as Applied to Aircraft Structure, Charles B. King 92
Teaching Marketing in Manufacturing Classes, Thomas Wright, Donald F. Smith 93

METRICS
Going Metric in Industrial Education Abstract: A Technical Subject Analysis with Resulting Identification of Minimum Performance Objective, Instructional Techniques and Student Exercise Development, Arvon D. Byle, John R. Lindbeck, Michael B. Atkins 96
Metrify or Petrify **(ACESIA)**, Robert D. Weber 97
An Introduction to Metrics in Industrial Arts, Ronald E. Jones 99

MISCELLANEOUS INSTRUCTION AREAS
Industrial Arts and Medical Devices?, James F. Fales 102

PLASTICS
Past and Future Perspectives of Plastics, Harry L. Campbell, Gary Weede 105
Initiating Plastics Statewide, Dennis Hirsch, John Gill 107
Plastics Instruction—An Experimental Approach, Gerald L. Steele 109

PUBLIC RELATIONS
Effectiveness of Motion Pictures in Industrial Arts Public Relations, Gerald G. Lovedahl 112

PUBLICATIONS
Newsletter Publication, Merle A. Denning 115
Textbook Publishing and the Classroom Teacher, Mark W. Huth 117

RESEARCH
Identifying Teacher Competencies in Production, David I. Joyner 120
The Role of Market Research in the Manufacturing Enterprise, Wayne D. Andrews 122
The Status of Minorities in Industrial Teacher Education in American Colleges and Universities, William A. Bakamis .. 124

A Comparative Analysis of Personality Characteristics of Industrial Arts Teachers in the United States, George R. Herbert 126

SAFETY

Legal Responsibility to Youth—Legal Responsibilities to You, Jerry Grover 129
How to Comply with OSHA Regulations in Laboratories, Clyde "Jack" James Jr. 131

SPECIAL NEEDS PROGRAMS

Preoccupational Education for Special Education Students, Ronald D. Yuill, Madonna Bennett 133
Teaching the Teachers of Exceptional Learners, James J. Buffer Jr. 135
Teaching Industrial Arts to the Deaf, Dennis Q. Drake 137
Special Needs Learners: Preparing Teachers for the Future, Ronald L. Koble 139
Describing Psychomotor Activities in Individualized Programs for the Handicapped, John Shemick 141
Industrial Arts, a Possible Missing Link to Helping the Learning Disabled Student, Robert E. Wenig 143

STATE and LOCAL ORGANIZATIONS

Organizing a Local I.A. Association, Joseph J. Bedics 146
Techniques to Developing a State Industrial Arts Conference **(AIASAO)**, G. Eugene Martin 148

STUDENT GROUPS

Colorado State University Industrial Arts Club Activities, Rodney Anderson, G. Gloeckner, B. Smeltz 151
AIASA Youth Leadership Training—A State Model, Dennis Hirsch, Anthony Taglavore, Samuel Ballard, Richard Bell .. 153

TEACHER EDUCATION

Materials: A Program for Future Industrial Arts Teachers, Joseph E. Carpenter 156
Competency Based Teacher Education **(ACIATE)**, Franzie L. Loepp 158
A Program that Provides School-based Experiences in Industrial Teacher Education, Richard Barella, Richard Henak 160
Inservice for the Industrial Education Teacher, C. Victor Larson . 162

TEACHING AIDS

Why Advisory Committees?, Joseph J. Cecere 165
Egg Drop—A Winner for Everyone, Gary Henderson 166

TEACHING METHODS

Hands-on Workshop **(ACESIA)**, Harold G. Gilbert 168
Symbolic Interpretation through Laboratory Experiences, Gloria Amatrudi, Vincent J. Walencik 169
Concepts or Clusters in Selecting Content, M. James Bensen.. 171
Shop/Laboratory Management, William E. McKell 173

A Merger—American Industry and Occupational Versatility, Louis J. Pardini, John Lavender 175
A Taxonomy of Applied Methods Designed to Increase the Reading Abilities and Verbal Aptitudes of Students in Industrial Education and Technology Programs, Richard I. Phillips 177
What Occupational Psychology Says to Industrial Arts, Ralph Ressler 179
Piaget and Teaching Industrial Arts, David K. Gore, Anthoney E. Schwaller 181

TECHNOLOGY
Ceramic Technology—Implications for the Industrial Arts Program, Cheng C. Liu 184
Technology in the Middle School, E. Allen Bame 186
Activities in Solving Technological Problems, Richard A. Kruppa 188
Youth's Needs for Technological Literacy, Donald G. Lux 190
Appropriate Technology and Community Development, John M. Manchester 192
Technology Today: Implications for Industrial Arts Technology Today, David Mohan 194

THEORY
Implications of Piagetian Theory for Early Childhood Industrial Arts: Cognitive Development **(ACESIA),** Richard J. Dahl .. 197

TRANSPORTATION
Auto Emissions Control, Jerry Gallagher 200
Appropriate Technology in Transportation, David L. DePue ... 201

WOOD
Noise Control in Wood Labs, Edwin C. Hinckley 204
Mass Production in Wood Technology Programs, Roger L. Keep 206

ASSOCIATION BUSINESS
Teacher Recognition Program, David P. Lorms 209
House of Delegates Meeting 211
Resolutions 218
President's Report 227
Committee Chairpersons 233
State Representatives 234
Atlanta Conference Planning Committee 236

AUTHOR INDEX 237

CAREER EDUCATION

AIAA. T-10:45-5
FOCUSING INDUSTRIAL ARTS ON CAREER EDUCATION. H. Bert DiPaul, teacher, industrial arts, Abington High School, Abington, Pa.

This manuscript can be used as a textbook by teachers who want to infuse career education into their industrial arts program. It shows how the school shop can be used by students to explore a wide variety of careers by means of hands-on-experience using tools, materials, and machines which are normally used by people employed in the occupation being tried. This book does not aim to change the organization or layout of the school shop. The student can be engaged in manufacturing, construction, drafting, or power mechanics. He can be working with metals, plastics, or wood. No matter what the nature of the work is, the kind of tools, or materials the student is using, he can be sampling occupations common to these tools and materials. But unless the student is made aware of the significance of his experiences in terms of careers, he will not be sampling occupations.

As its title implies, FOCUSING INDUSTRIAL ARTS ON CAREER EDUCATION, makes both students and teachers more keenly aware of the importance of career education and the opportunities for sampling various occupations which exist in the school shops. It introduces the concept of viewing the school shops as exploratory centers for discovering student interests and abilities. It shows how the shop can be used to increase the student's knowledge about himself or herself to identify strengths and weaknesses, abilities, and interests. It shows how knowledge about self can be used to match the student's qualifications with the requirements of a particular occupation.

It will take the average high school student about one year to complete the learning exercises outlined in this book. The student begins his shop experience by selecting a tentative career from the list of occupations which can be sampled in his school shop. The list for a particular shop is prepared by the instructor. It should be based on the type and variety of equipment contained in the shop. It will be similar to the list of occupations shown in Unit 3 of this book. After selecting the occupation he or she wants to explore, the student chooses a work sample or project from a list of drawings provided for this purpose on pages 15 to 69.

While working on the object of his choice, the student learns to analyze his experience in terms of positive or negative feedback. If the work is enjoyable, satisfying and generally pleasant, it will strengthen his occupational choice. This type of experience is called positive feedback. If the experience is frustrating, displeasing, and generally distasteful, it will weaken his choice. This type of experience is called negative feedback. Thus, the student learns to evaluate his shop experience in terms of occupations.

Industrial arts teachers who want to add career education to their programs will welcome FOCUSING INDUSTRIAL ARTS ON CAREER EDUCATION because it is written by a teacher who knows the needs

of his colleagues. It is written in language which the average ninth grade student can understand. It is patterned to fit into the present school shop programs using the same tools and equipment. No major changes are necessary. Review questions at the end of each unit serve to evaluate the educational outcome in terms of the behavioral objectives at the beginning of each unit. No other testing is required. If the student can answer the review questions, the required behavioral changes have been effected.

A section of this textbook deals with proper work habits and personality traits. It explains personality and the various personality traits in terms which the student can understand. It includes a rating scale for personality characteristics which can be used for either self-reporting or observational reporting. The student is advised to use both methods. In self-reporting, the student uses the scale to rate himself or herself. In observational reporting, the student asks a friend to rate him.

Another section of the book is entitled "Technology Yesterday, Today and Tomorrow." Here the student learns about early manufacturing processes, mass production, automation, and the use of computers. By studying mass production, the student gains a better understanding about motion and time study, work simplification, and the flow process chart. He also learns how interchangeable manufacturing and quality control make interchangeability of parts possible. By studying automation, the student learns about the three levels of automation: low, medium, and high. An example of low level automation is a numerically controlled machine. An example of medium level automation is a number of numerically controlled machines grouped together along a production line; each machine is connected to the other by means of a transfer machine. An example of high level automation is a fully automated and computerized steel mill. These various examples are illustrated in the book.

The last section of the book is entitled "Getting a Job and Holding it." Here the student learns how to prepare a resume, how to answer want ads, and how and where to apply for a job. With this knowledge, the student is hopefully prepared to go out into the working world.

The book is well illustrated. In addition to fifty drawings of work samples or projects, it includes many pictures of automatic conveying devices, machines, and automated manufacturing processes.

AIAA. T-10:45-5

INDUSTRIAL ARTS IN CAREER EDUCATION. James Hales, Professor and Chairman, Division of Technology, Fairmont State College, Fairmont, WV. and William R. Thompson, Associate Professor, Division of Technology, Fairmont State College, Fairmont, WV.

Career Education is a viable component of the curriculum in our modern schools. The concept is divided chiefly into four levels, Awareness, Orientation, Exploration and Preparation. From Kindergarten through Adult learning, Career Education is more than just the development of saleable skills. Students enrolled in career education programs experience a truly interdisciplinary program which leads to an understanding of society and the individual's relationship to society. Emphasis is placed on the interaction of technology and the world community; the establishment of good attitudes about work; and an awareness of the variety of careers available to the individual.

The role of Industrial Arts in the concept of Career Education is both broad and diverse. Though activities associated with IA may be found throughout the school curriculum, Industrial Arts goals may be most realized in its role as the vehicle for part of the Career Exploration Program on the ninth and tenth grade levels. In West Virginia, the world of work at this level is divided into four areas containing the 15 occupational clusters as identified by the U.S. Office of Education. They are Industrial Occupations, Service Occupations, Business Occupations and Environmental Occupations. Industrial Occupations reflect the careers of Manufacturing, Construction, Transportation and Communications. It is here where Industrial Arts makes its contribution.

In the Career Exploration program, the approach, long employed by Industrial Arts educators in the study of technology, takes on a new look. No longer are materials and processes the main thrust, but rather serve as a means to an end in their emphasis toward specific careers. More time is devoted to exploring careers and related materials and activities than on craftsmanship and research. Established Industrial Arts terminal objectives in the cognitive and psychomotor domains are largely supplanted by objectives in the affective domain. The chief goal of Career Exploration is the establishment of attitudes about careers, through selected activities, not specific knowledges and skills. With the successful completion of this level of Career Education, students should be able to make rational decisions about careers and career preparations to guide them at their next educational level.

A comprehensive program for the study of Industrial Occupations within Career Exploration, would be structured so as to allow students to choose the areas they wish to explore. The number of studies might also be established by MBO or contracting exercises. Each unit or career would be of set duration involving activities and problems associated with that career. Actual programs would be competency-based and progress directed by the individual. The net outcome of the exploration of the careers would be the development of attitudes about those occupations, though psychomotor and cognitive competencies would also be developed.

The advantages of Industrial Arts playing a role in Career Education are well known. The opportunities for personnel and program development are limited only by the philosophy of the Educator and the approach to the study of technology.

AIAA TH - 2:30 - 3:30.
THE UTAH INDUSTRIAL ARTS CAREER EXPLORATION PROGRAM. LaVoy Starley, instructor, Industrial Arts, Cedar City Jr. High School, Cedar City, Utah; Lee Abraham, instructor, Industrial Arts, Dixie Jr. High School, St. George, Utah.

It is fitting that those concerned with industrial arts education should periodically undertake a realistic evaluation of its past and present programs with the clear intent of making industrial arts more meaningful in light of the emerging needs of our society. Concluding many years of contemplation a decision was made by the Utah State Specialist for Industrial Arts to fuse together the established strengths of the traditional and experimental industrial arts programs with modern innovative ideas and concepts which whould provide a foundation for a new industrial arts career exploration program.

The IACE program is a mixture of Career and Industrial Arts Education. The program is organized around the industrial-based cluster concept to provide individualized student centered, hands-on learning experiences which effectively meet the needs of junior high school students.

The clusters are:

Construction
Manufacutring
Industrial communication
Transportation

The learning activities are:

*Relative with industrial tools, equipment, materials, processes and techniques.
*Designed to incorporate multiple instructional strategies.
*Designed for successful hands-on experiences.
*Developed in accordance with physical and intellectual growth patterns and individual differences.
*Designed sequentially from simple to complex.
*Designed to encourage student initiative and personal responsibility.
*Designed for elective non-graded student enrollment.
*Co-eductional

The IACE curriculum incorporates three dimensions of learning .

The dimensions of learning are:

1. Career related information
2. Career Activities
3. Career development profile

The career related information provides the students with information about careers within the clusters. The information is directly related to the career activity experience of the program.

This information is based on the following criteria:

*What is the occupation all about?
*What, exactly, does the person do?
*What is the working environment?
*What are the education and training requirements?
*What are the job prospects?
*What are the likely salary ranges?

The career activities are developed around the occupations of each career cluster.

Career activities are divided into two categories:

*Useful student projects
*Industrial simulations

The career development profile emphasizes:

*The relationship of each occupation identified with a career activity to data, people, and things,
*Indentification of likes or dislikes toward each career activity, and
*Encourages students to start formulating a career identity.

The new career exploration program has three sequential levels: a modular structure concept has been incorporated for Level I. The modular units include a:

*Self contained tool carrel
*construction section, or
*mock-up, with
*pictorial procedure manual
*coordinated with an audio tape

A career activity package system (CAPS) has been developed for Level II. The career activity packages for Level II are simple, pre-designed, individualized career activities.

The career packages include:

*Career related information
*Student project or activity directions
*Career evaluation

The career activity packages are supported by:

*Machinery operation packets (MOPS)
*Power tool references (PTR)
*Machinery information references (MIR)
*Hand tool references (HTR)

Level III incorporates more complex pre-designed career activity packages and provides a system for advanced students to research and design their own personal career related projects and activities.

The new career exploration program also incorporates an individualized mass-production system.

This system includes:

*A mass-production center (bench)
*Individualized procedure manuals
*Tape and slide orientation
*Set of jigs and fixtures

This is in brief a summary of the Utah Industrial Arts Career Exploration program. The IACE program is now in its third year of pilot testing and implementation. The schools now using the IACE materials have experienced a great deal of success especially in the vital area of student interest.

Due to the unique nature of its curriculum, industrial arts is in an enviable position to provide appropriate career exploration. The Utah Industrial Arts Career Exploration program was exhibited at the Commissioner's Conference on Career Education at Houston, Texas, November 7-10,1976. It was enthusiastically received and the display was reportedly one of the best exhibits at the conference.

The Industrial Arts Career Exploration program doesn't have all the answers, but is certainly a program worth considering in every junior high or middle school.

CURRICULUM

ACIAS. TH-3:45-5:00 p.m.

THE INDUSTRIAL ARTS CURRICULUM K-12. Thomas A. Hughes, Jr., State Supervisor, Department of Industrial Arts Education, Commonwealth of Virginia, Richmond, Virginia 23216.

Introduction: This model Industrial Arts Curriculum Plan was developed to answer the need for a clearly identified role and curriculum for Industrial Arts in grades K-12. The expectations of the curriculum are presented in total and at the different educational levels. The courses which collectively make up the total curriculum are also given.

The Industrial Arts program for many years has been recognized to teach students about the industry and technology. The Vocational Amendments of 1976 cite Industrial Arts of this type as vocational under certain conditions. However, industry and technology covers such a vast amount of topics and information - a problem develops in defining what would be most beneficial for the student to experience when studying such an extensive area.

To answer this problem, the Industrial Arts Service through the assistance of a state-wide curriculum council has been critically examining what Industrial Arts should actually be.

Mission: The mission of Industrial Arts in Virginia is to assist each student to develop an understanding about all aspects of industry and technology, and to aid in the discovery and development of individual potential.

Elementary Program: The goal at this level is to compliment the school's program by providing learning reinforcement through the use of tools and materials that contribute to personal development and technological awareness. The program is offered in classrooms with tools, materials and supplies to accomodate student needs and the activity required.

Orientation and Exploration Program: The program designed for the middle or junior high school provides the student with broad try-out experiences and insights into career opportunities. It gives a basis for personal assessment of work interest and aptitudes. Instructional emphasis: assisting students in making informed and meaningful occupational and educational choices.

Pretechnical Program: The program designed for the senior high school provides a foundation for career preparation either at the secondary or post-secondary level. This technically oriented program compliments the junior high program without duplication. Instructional emphasis: preparing for advanced vocational or technical programs.

Personal Enrichment Program: The personal enrichment program is designed for the senior high school to provide general education about the industrial and technological aspects of our culture. It prepares students with technical competencies that result in responsible citizenship, intelligent product selection, and worthy use of leisure time. Program emphasis: providing consumer information, avocational skills, and technical understanding.

Student Organization: The American Industrial Arts Student Association, AIASA, is included as a part of the instructional program to promote leadership qualities, high standards of craftsmanship, scholarship and safety. Teachers integrate chapter activities within their instruction by using the community's resources, parlimentary procedures, and recognition.

AIAA. TH-3:45-5 2/28/78 #4

AN INSTRUCTIONAL PLAN FOR TECHNOLOGY EDUCATION IN WETZEL COUNTY, WEST VIRGINIA, K-12. D.W. Shepherd, R.E. Peterson, F.E. Fox, S.L. Cole, Training Associates, Program for the Study of Technology, West Virginia University, Morgantown, West Virginia 26506.

Project Open, Wetzel County is a joint curriculum development effort between the Wetzel County Board of Education and the West Virginia University Technology Education Program. The project was initiated at the high school level during 1973 and has since expanded to include grades 3-12, with plans to encompass all grades K-12.

Project Open is based upon the study of technology. The major emphases of the project are the development of both teachers and instructional programs. The instructional programs have been designed to enable students to incorporate technology into their cognitive perspective of the world, recognizing both the nature of technology and some of the interrelationships between technology and life style.

As we see it, the major purpose of technology education, being general education, is to help build a citizenry which is able to manage technology toward the creation of a more humane society. The main message which we continue to work toward delivering is that: technology, the uniquely human mode of thought and action by which mankind affects change in his many environments, has had, is having, and will continue to have profound effects upon the way we live; technology, a most vivid example of the creative genius of some men, must be more widely understood if we are to move toward the creation of a more humane society; and this understanding of technology must integrate the elements of futurity and control by encouraging an eye toward the future and the feeling that something can be done about that future. We consider this broad statement as providing the central construct upon which our Project Open efforts have been based. With this major construct and purpose as outlined above, the Wetzel County consultant team is developing the following instructional ideas for grades K-12.

The overall instructional attack is generally one of increasing content specificity and detail as students approach the 12th grade. At each grade level students are exposed to an increasingly sophisticated view of the systemic relationships involved in the study of technology. In the earlier grades technology is viewed simply but wholly, while the higher grades provide more opportunity for the in-depth study of special interest.

The elementary school technology program is interdisciplinary in nature and in harmony with the existing curriculum. It serves as a reinforcing, unifying, and integrating factor in augmenting the elementary school curriculum while providing the opportunity for students to apply knowledge gained in many subject areas in a functional manner. Two overlapping approaches to this program are under development. One approach in grades K-5 utilizes existing classroom teachers while another in grades 4-6 employs a specialist teacher and a separate lab. Content is selected from the discipline of technology and is blended with existing content themes, student abilities, needs, and interests.

Sample Activities

K...Students listen to selected readings such as: Who Are the People in Your Neighborhood?, What Do People Do All Day?, and Things That Go. Students manipulate a wide variety of local materials while considering where they come from and how we use them.

(1) Students identify and use common tools found in the home environment--telephone, typewriter, electric mixer, etc. Students plan and

prepare a food recipe--publish a collection of children's recipes.

(2) Students identify the location of selected community resources and services, and prepare a map or directory of services children use.

(3) Students explore the ways in which mankind uses his environment and the interdependence of selected systems. Construction of a solar reflector, sun clock, etc., can be used to explain characteristics of our solar system.

(4) The adaptive systems of mankind and the material requirements for sustaining life are explored by students through role-playing the lifestyles of different cultures while considering the effects of various environments.

(5) Students consider our technological heritage and the formative role it has played in shaping contemporary ways of doing things. Visiting museums and local historical sites, documenting the oral history of an industry, and constructing models are activities employed.

(6) Students investigate the interface between man-made and natural environments. Students construct displays and model selected ways of processing natural resources; values related to use and management of technology are considered.

The 7th grade program is designed to show, through both study and laboratory experience, that mankind's technological capability is playing a vast formative role in shaping current life-styles. Through reading, planning, constructing, and simulating, the teacher leads the students in the examination of near-current and current technological developments and practices, and helps to relate them to current life. Sample Activity: Students simulate what life would be like without such things as automobiles, telephones, television, water heaters, and pre-processed foods.

The 8th grade program builds upon the 7th grade experience as students, through learning activities similar to those employed in the 7th grade, examine contemporary technologies. However, the primary thrust here is to show that these contemporary technologies hold implications for the future. Sample Activity: Student researches, plans, constructs, and demonstrates an alternative energy source.

The 9th grade program is designed to provide an overview of the discipline of technology in terms of the three technical areas balanced by their social-cultural concomitants. Four units of approximately nine weeks each provide a general orientation to some of the more technical aspects of the study of technology while examining some of the human questions with regard to the changing nature of work, family structure, leisure, consumption, and more. The systematic nature of the study of technology is stressed throughout. Appropriate individual or group laboratory experiences are guided by the teacher toward this end. Sample Activity: Students research, plan, construct, and demonstrate dynamic models in the areas of transportation, communication, and production while examining their systemic natures through group discussions, readings, and the involvement of local community leaders.

Three full-year programs are offered in grades 10-12, one each in the areas of production, transportation, and communication. These allow students to study and explore each technical area and its social/cultural implications through carefully guided laboratory and community experiences.

This instructional outline is not intended to represent the "ideal" of the authors, Wetzel County Scools, or West Virginia University. What is represented here is merely the present state of a still developing instructional plan which has been guided by the authors and influenced strongly by school and community realities.

W- 7:00-5 7:00 - 8:30 p.m. Hickory Hill
AIAA Special Interest
TOPIC: Industrial Arts As A Liberal Arts Course In College

A discussion of courses that can be offered by Industrial Arts Education Departments in colleges and universities.

Presenter: Thomas J. Morrisey
Chairman: Rex Miller
Host: Jerry Joyner

For the past several years the Industrial Arts and Vocational Education Department at the State University of New York's College at Buffalo has developed and offered several all-college elective courses which may be taken by students as yet uncommitted to a major or students majoring in one of the many different programs at the College. These courses were designed to fulfill the requirements for the general-liberal portion of each degree program. Each degree program requires 60 semester hours of credit in the general-liberal area.

These courses had to be approved by representatives from all of the college's faculties. The approval procedure for this type of course is much more complex than the usual course approval procedure. Approval has to be secured from departments offering courses with which this course might conflict as well as approval from within the department.

However, once the courses are approved and properly promoted, they can have a very positive effect upon the department in a number of ways. The courses not only serve to generate a large number of FTE's but they also serve to make the large number of uncommitted students on campus aware of the teaching opportunities available in the area of industrial arts and vocational education.

Two of these courses, "Development of American Industries" and "Survey of Industrial Pollution Control Problems", have proven to be extremely popular with the students in the past few years. In fact, for the past five years, two sections each of these two courses have been offered every semester. Each semester the enrollment for these two courses has always been in excess of two hundred students.

The "Development of American Industries" course begins with the Industrial Revolution in the United States and concludes with the present trends in American industry. A wide variety of teaching aids are employed in the presentation of the course material. Field trips are taken to a wide variety of firms in the Buffalo area that relate directly to the unit being covered in the course. The field trip enables the student to obtain an excellent overview of the material being presented in the classroom portion of the course.

"Survey of Industrial Pollution Control Problems" is a course that is concerned with the major industrial pollution control problem areas: air pollution control, solid waste management, noise, and water pollution. The course also has a unit on energy and pollution control. In this course, as in the course entitled "Development of American Industries", a wide variety of teaching aids are employed in the presentation of the course material. Field trips are taken to a wide variety of Buffalo-area firms to observe and study the devices and techniques which are employed in pollution control. In addition, a boat trip is taken to observe industrial pollution control devices and techniques that are employed to clean the waters in this heavy

industrialized area.

Attracting students to elective courses such as these is a problem unless a concerted effort is made to make the course attractive and interesting to students from a wide variety of programs and educational preparation. Every effort is made to constantly upgrade and promote the courses both on and off campus. These two courses have attracted over 3100 students since they were first introduced. Because one section of each course is offered in the day session and one section of each course is offered in the evening session, the course attracts both full-time and part-time students.

These are two of the all-college electives that we have developed and introduced. Presently, we are in the process of developing and introducing other courses which will appeal to a wide segment of the student population.

AIAA. W-10:45-1.
A MODEL FOR CURRICULUM DEVELOPMENT. John M. Ritz, assistant professor, Industrial Arts Department, Old Dominion University, Norfolk, Virginia.

Curriculum development is one of the key factors relating to the meaningful and successful industrial education program. If one were to examine the curriculum development procedure, a number of recurring structural elements would be identified that are useful in the construction of a curriculum in industrial education. This review will be devoted to an identification and explanation of these elements. It is pursued to offer industrial educators additional tools that may be used in the educational process. Besides this, if educators are familiar with the logic and rationale accompanying the curriculum development process, they should be better equipped to defend and implement any program in their industrial education curriculum.

Analysis of reports and texts in the curriculum area reveals that many proposals have been suggested for models or steps to be taken in educational program development. Those that appear to be most systematic are shown in Figure 1.

Figure 1. Structural Elements Useful in Curriculum Development.

I. CURRICULUM FOUNDATIONS

- A. Definition of Program Area
- B. Rationale for the Study of the Program Area
- C. Content Source
- D. Content Structure
- E. Program Aim
- F. Program Goals

II. CURRICULUM CONTENT

- A. Scope
- B. Sequence
- C. Unit Specifications
  1. Unit Goal
  2. Unit Rationale
  3. Unit Objectives
  4. Unit Activities
  5. References

III. CURRICULUM EVALUATION

- A. Student Evaluation
- B. Document Validation

The remainder of this analysis will explain each of the structural elements cited in Figure 1 and how they may be employed in the development of an industrial education course or curriculum.

Curriculum Foundations are the major components that influence and control the content and organization of the curriculum[1]. Such components as (1) definition of the program area, (2) rationale for the study of the program area, (3) content source, (4) content structure, (5) program aim, and (6) program goals are included in the curriculum foundations. The definition of the program area establishes the boundaries for the curriculum development process. A rationale emphasizes the need to study the program area in the schools. A content source defines the knowledge base from which curriculum content is derived for use in the program development. The content structure is employed to display how the information being derived from the content source might be arranged for program and unit development purposes. Next the program aim describes the expected outcome of having students study the content prescribed in the curriculum. Finally program goals are established to predict long range program outcomes that reflect the direction in which the curriculum should work.

Curriculum Content is the second major category of curriculur elements. It includes the knowledge, skills, and values which educators are interested in conveying to learners. In this category are included the scope, sequence, and unit specifications. The term scope encompasses the magnitude of content and objectives within a curriculum[2]. Sequence is the ordinal structuring of the content found within the curriculum[2]. Finally, unit specifications are those elements which are helpful in the actual developing and structuring of the program or unit of study. The components of unit goal, unit rationale, unit objectives, unit activities, and references are located within this element.

Curriculum Evaluation is the final broad category of curriculum elements. It exists for two primary purposes. First, it attempts to measure whether learners are achieving the content objectives set forth in the curriculum, and secondly, whether the curriculum is doing what it is supposed to do. Therefore, the evaluation category of a curriculum should be divided into the student evaluation and document validation elements.

In the above discussions, a number of useful curriculum development elements have been cited and illustrated. These elements have been organized into three categories. They include curriculum foundations, content, and evaluation. If these elements are employed in the development of an industrial education or other curricular programs, a more meaningful and understandable curriculum should result. This would occur because those who are developing the curriculum must identify and structure their ideas following a logical sequence. This would allow for more directed dialogue and research by those undertaking curriculum development. Consequently when these steps are used in the curriculum development process, a number of effective instructional programs and units should result.

FOOTNOTES

1. Zais, Robert S. Curriculum Principles and Foundations. New York: Thomas Y. Crowell Company, 1976, p. 101.
2. Beauchamp, George A. Curriculum Theory. Wilmette, IL: The Kagg Press, 1975, p. 198.

AIAA. TH-3:45-3

STATEWIDE CURRICULUM ARTICULATION. Tom Ryerson, Industrial Education Supervisor, Minnesota Department of Education, St. Paul, Minnesota and Marson Rinkenberger, Curriculum Consultant, Statewide Curriculum Articulation Center, Maplewood, Minnesota.

Minnesota enjoys a comprehensive industrial-vocational education system encompassing several levels of education. Required programs in industrial education for junior high students and comprehensive senior high industrial education offerings have long characterized Minnesota Industrial Education.

Post-secondary vocational education is delivered through a system of 33 area vocational-technical institutions presently enrolling 30,000 full-time students. Approximately 1/4 of the workers entering the state's labor force for the first time are graduates of this system.

The duplication of facilities, equipment and teaching effort at the secondary and post-secondary levels has led to criticism from taxpayers, students, and others. The Statewide Curriculum Articulation Center, located in Maplewood, Minnesota, is a Center functioning to develop an industry-validated, competency-based curriculum and to design a smooth transition from secondary to post-secondary programs.

In 1972, the Vocational-Technical Division, State Department of Education, funded a research and development project to define methods which would vertically articulate curriculum. Vocational curriculum is vertically articulated when a student can progress from one level of training to the next higher level without experiencing unnecessary gaps or overlaps in a program of study. Research and development produced three phases for the articulation process.

The first phase involves the structuring of curriculum current with industry needs so that teachers throughout the state have a common understanding of what should be taught in a given program area. Using task lists which have been developed by a statewide committee, teachers work together to develop terminal performance objectives. This establishes a common understanding of what the students are to learn and sets the standards of performance that articulating schools and industry consider acceptable.

The second phase of the articulation process involves the development of tests which are used to assess student competencies. Criterion-referenced objective and performance tests are developed by instructors so that the tests match the objectives and are uniform throughout the state. A competency record is then used by instructors to convey to other instructors or employers the student's ability to perform job tasks.

Finally, the third phase involves the updating of articulated materials developed at the regional level (terminal performance objectives, performance tests, and instructional materials) and the inservicing of new staff members who are just beginning to teach in the vocational institution.

In all, Minnesota's Statewide Curriculum Articulation Model consists of eight individual steps.

1. Identification process of an occupational program area.
2. A task analysis and task list development for the occupational program area.
3. Development of a competency record.
4. Development of terminal performance objectives for each of the tasks in the task list.

5. Development of criterion-referenced tests.
6. Development of instructional materials or modules.
7. Regional site evaluation, modification, revision.
8. Statewide implementation updating and monitoring effectiveness.

The model graphically displays the overriding importance of providing teacher preservice and inservice education. Presently, teachers and administrators articulate curriculum by being involved in regional activities.

Four program area are nearly completed: Auto Mechanics, Secretarial/Clerical, Bookkeeping/Accounting and Food Service Occupations. Other program areas in various stages of development include: construction occupations, data processing and truck mechanics. All vocational program areas will receive attention as time and resources become available.

The Minnesota Statewide Curriculum Articulation Model can be used on a continuing basis to update, revise, and improve the quality of vocational-technical curriculum throughout the state. Publications were developed, printed, and field tested for the purpose of guiding teachers in making decisions during the articulation sessions.

The following materials have been developed;

1. Burger, Laura; Lambrecht, Judy; Allen, Deena; and Loebs, James: Handbook for Vocational Instructors Interested in Competency Based Education, 1974.
2. Burger, Laura; Allen, Deena; and Loebs, James: Competency Based Route to Vertical Curriculum Articulation, 1975.
3. Automotive Task Lists by Statewide Working Committee: Automotive Mechanics, Service Center Mechanics, Lubrication Specialist, Exploratory Program for Auto Mechanics, 1975.
4. Statewide Finalizing Committee: Terminal Performance Objectives for Competency Based Instruction, Automotive Mechanics Occupations, 1978.
5. Burger, Laura and Allen, Deena: Competency Assessment: A Vocational Instructor's Guide to Developing Written Tests, 1976. Competency Assessment: A Vocational Instructor's Guide to Developing Performance Tests, 1976.
6. Secretarial/Clerical Task Lists: Office Services Aide, Typist, General Office/Typist, Receptionist, Secretary/Non-Shorthand, Secretary/Shorthand, Data Entry Operator, Medical Secretary, Legal Secretary, Educational Office Personnel, Correspondence Specialist and Administrative Assistant, Correspondence Supervisor, 1976.
7. Bookkeeping/Accounting Task Lists: Accounting Clerks: Accounts Receivable Clerk, Accounts Payable Clerk, Inventory Clerk, Billing/Invoice Clerk, Purchasing Clerk, Cash Receipts Clerk, Cash Disbursements Clerk; Cost Clerk; Payroll Clerk; Bookkeeper; Accountant: Public and Private, 1977.
8. Construction Trades Task List: Carpenter, 1977.

AIAA. W 10:45-2

INTEGRATIVE INSTRUCTIONAL APPROACHES FOR INDUSTRIAL ARTS COURSES

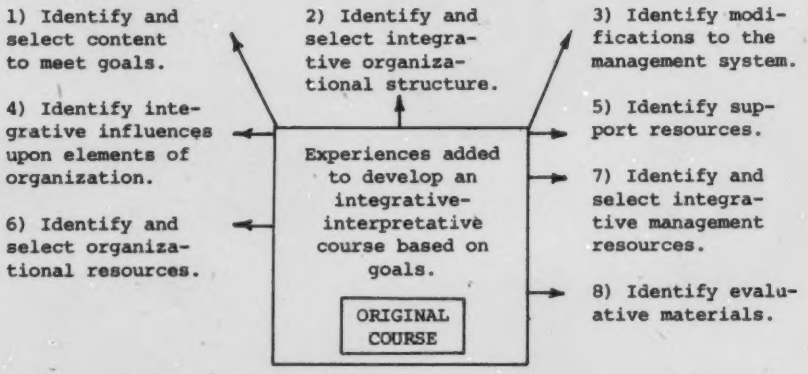
Earl E. Smith, professor, Department of Industrial Education, Oregon State University, Corvallis, Oregon.

Contemporary trends in industry have created some major changes in the way we should orient and/or prepare students for future jobs. They also influence how we should conduct programs, and the criteria we should use for determining effectiveness. Of particular import is the need for development of industrial arts courses that include a broad, career emphasis approach to content and activities. To accomplish this, we must alter our courses in ways that integrate new learning experiences.

The use of an integrative course approach offers extensive opportunities for career-oriented experiences. Our traditional courses have emphasized a study of tools, materials, and processes; often to the exclusion of other important educational goals for industrial arts. The integrative-interpretative approach provides opportunity for use of typical course structures, enriched with almost a saturation of career- and industrial-type experiences. This also assists in resolving instructional needs of technologies and career cluster approaches.

Starting with a representative traditional unit or general course oriented to tools, materials, processes, and projects--with a limited study of other aspects of industry--let us consider how we might alter and enrich a course toward an integrative approach. If we choose to alter our complete program, it is possible to develop our course offering around the basic elements of one or several well-established approaches to industrial arts. We can choose elements or a complete course from contemporary programs that stress a unified study of industry through integrative or interpretative experiences.

When we choose to retain, but modify, an existing course, then we must look to the individual instructional segments that could create integrative learning experiences. Starting with the original course goals, we would begin to modify and enrich the goal expectations to provide for a study of industry, careers, and technology through a system approach, as illustrated below.


1) Identify and select content to meet goals.
2) Identify and select integrative organizational structure.
3) Identify modifications to the management system.
4) Identify integrative influences upon elements of organization.
Experiences added to develop an integrative-interpretative course based on goals.
5) Identify support resources.
7) Identify and select integrative management resources.
6) Identify and select organizational resources.
8) Identify evaluative materials.
ORIGINAL COURSE

After modification of course goals, we would then review the present units of content to determine new material that serves the integrative expectations of the redirected goals. Additions we might consider include: career information and experiences; across-technologies integration; adding more fields of study, jobs, and skills; integrating content around competencies, activities, and problems.

With the new goals and content established, it will be necessary to establish an organization that serves to integrate the new material. Current organizational patterns that might serve as models or resources include: industry, functions base, concept base, business systems, technologies, American industries approach, and career clusters.

New management resources patterned upon industry and business organization would bring new opportunities for students to experience the human factors so essential for career success. Placing these resources into a master plan for course management would enrich our present courses with many of the necessary developmental experiences for career education.

Traditional industrial arts courses have long been oriented around the process and the student project. Today, if we are to meet our educational goals, the program must include new and enriched activities that meet more of the career exploration expectations. Using the body of content in new ways, we can provide integrative activities that: are based on career functions, stress commonalities of activities, integrate disciplines, are concept oriented for increased applications, or are self instructional.

Integrative actions will also shape the new course through influences upon the elements of course organization. We will find that the integrative additions will affect such diverse areas as: teacher responsibilities, facilities use and organization, nature of instructional materials, evaluation, instructional sequencing, and time/block sequencing. Each of these will need to be adjusted to the new integrative concept if the changes developed earlier are to become a meaningful organization of learning experiences.

In an additional, supporting capacity, we would need to identify the general resources that would achieve our stated integrative approach to organization and management. This course development procedure is heavily dependent upon support resources that bring the integrative experiences to life through actual student involvement with both the setting and the resources.

A final step in the process would be to establish evaluative procedures for students, activities, and program. The resources used will be influenced by our program and course goals for developing an integrative learning environment that includes essential experiences for the career development process.

In summary, we might consider the educational advantages of the integrative approach. It offers high potential for: improved integration of content, varied instructional strategies, high student interaction, self-management, improved use of program time, and improved career experiences.

AIAA. W-3:45-9.

A CASE STUDY OF CURRICULUM, FACILITIES AND METHODOLOGY INNOVATION IN INDUSTRIAL ARTS TEACHER EDUCATION AT BOWLING GREEN STATE UNIVERSITY.

Jerry Streichler, Professor and Chair, Department of Industrial Education and Technology, Bowling Green State University, Bowling Green, Ohio 43402.

This presentation is in the form of a case study of mission, program, faculty development and facilities in one department over a 10 year period. Limited space allows review of the concepts and guidelines which were applied in fostering the changes. These are followed by capsules of the changes. Hopefully, teacher educators in other institutions will note and benefit from the similarities and differences between our efforts and their experiences in program development.

CONCEPTS OF PROGRAM

1. There is an identifiable and organizable body of knowledge of technology as manifested in industry and in industrial arts education we are obliged to develop that content to its highest level of sophistication.
2. The content may be broader than what may evolve from traditional industrial arts. Thus, departments may need to add services associated with other areas or use offerings in other departments within the university.
3. In a major university it would be improper to add courses like industrial management, industrial psychology and personnel as part of the technical content component of industrial arts teacher education-when they are already effectively taught by other departments.
4. Faculty within the department are obligated to draw upon and often integrate experiences and content noted in Item 3 in their courses--particularly those which deal with the concepts or synthesize industrial technology.
5. There is little justification university students making elementary, junior or senior high school projects to fulfill requirements of technical subjects. We asked ourselves: Is it proper on the university level--to use junior and senior high school level text books and to replicate junior and senior high school activities and to pass these off as appropriate university level content in industrial technology?
6. Technical content for industrial arts teacher preparation--is appropriate also to students with career and educational goals different from those who wish to prepare to teach.
7. Such technical content will encourage the development of an eclectic faculty comprised, perhaps, of teacher educators, engineers, and industrial technologists. Such a group may be able to better communicate and create challenging activities and content configurations for all students who can benefit from industrial technology studies.
8. (a) Prepare to teach industrial arts and industrial subjects on all school levels; (b) prepare to work in industry as technical managers, and (c) wish to pursue such studies for liberal education purposes.

Thus, industrial technology provided a source of content. We also adapted the dynamics of industry as a basis to create an effective

learning environment in the technologies. We adopted the profit-making cost-effective efficient resource utilization consciousness of industry and let it flourish in all educational environment. It produced; 1) flexibility within traditional courses to change content and instructional strategies with relative ease; 2) ability to institute "non-traditional" learning experiences like independent research, individualized instruction, availability of considerable alternate learning strategies; 3) alternatives in instructor assignment-teams-differentiated staffing modes including use of graduate assistants and technicians; 4) research as an integral part of program: a) foster research activity for students at all levels - research as an instructional strategy; b) research and evaluation of curriculum: an indispensible component if one accepts the industrial model; c) continuous monitoring, correction and improvement of process (curriculum) results in improvement of student performance (product).

About halfway through the 10 year period we moved into a new facility which allowed us to mesh - our program concepts, mission ideals and staff relationships with ideals of a physical environment. We developed a building which fosters developmental activities in subject matter content, pedagogy and facilities utilization research. Rapid, efficient movement of laboratory equipment is possible for simulation and replication activities. We are able to engage in facilities planning for schools, industrial engineering, production planning and control, production, quality control, and materials handling. We have utilities which foster flexibility and while initially expensive these will not need to be changed over the next forty-to-sixty year period. Several laboratory areas are not separated by fixed walls of any kind as they are in buildings of traditional design. Where cleanliness or sensitive instrumentation dictated walls were used. The entire facility is environmentally controlled with respect to heat, ventilation and sound and the building can easily be expanded with removable curtain perimeter walls.

Communications are an integral component of subject matter - i.e. computers and television applications in inventory control, process control, instrumentation, data storage and retrieval completely supporting instruction. For efficient instruction and use of instructor and student time, we are able to bring the library to students anywhere in the building. Varieties of information, including short lectures, and individualized programed instruction can be delivered to students when and as required near laboratory stations and in various media as T.V., synchronized audio-visual filmstrips, slide systems, or pamphlets. A computer center and an instructional media center is an integral part of the building and its instructional program. Carrels and terminals and a completely flexible system of two-way communications between those centers and all other parts of the facility were specified.

All these elements, communications, open areas, special utilities provisions, and locations of laboratories to intentionally achieve overlap or interface of certain specialized technical areas - permitted us to characterize the building as a living organism. An organism so constituted would respond, we believed, most effectively to the primary stimulus for which it was conceived: the program.

For the program information write to the presentor.

AIAA SPECIAL INTEREST SESSION TH - 3:45-1

TOPIC: "A Model Home Maintenance and Repair Curriculum Guide for High School Boys and Girls"

Presenter: Eugene Sherrell

Chairman: Andrew Housand

Host: Charles Riales

The usual source for the content of courses taught in the public schools is a curriculum guide organized by the state department of education or the individual school districts. In Missouri, as well as other states, it was felt that a curriculum guide was needed for the area of Home Maintenance and Repair for Industrial Arts classes taught at the secondary level. We then attacked this problem as a research project. The research was to establish if such an area was needed, if an interest existed, and what had been done up to the present in the public schools of Missouri. The results of the research was the development of a curriculum guide for secondary Industrial Arts on Home Maintenance and Repair.

In the beginning we were uncertain if any such program or courses existed that could be identified as Home Maintenance and Repair. The project was begun with an inquiry to all the State Departments of Education in the United States as to the present development of any kind of curriculum guide dealing with Home Maintenance and Repair. The results of our inquiry of those who replied indicated that presently no state had or was developing such a curriculum guide. A study was then conducted in Missouri from which the following general conclusions were drawn.

Classes offering course content relating to Home Maintenance and Repair have evolved from offering courses in Industrial Arts for just girls in the junior and senior high schools of Missouri. Because of the girls' interest in the home, the Industrial Arts teachers independently devised units of learning that would relate to the home rather than follow the normal Industrial Arts course content. The result has been a very comprehensive group of learning units that relate to the home.

The name of the course was most often called "Home Maintenance and Repair", and several publications were used as texts. One semester was the most common time period for offering the course, and the average number enrolled per class was 20 students.

Very little additional equipment seems to be required to teach these courses other than that which is already available in the average Industrial Arts general shop laboratory. The supplies needed for these courses are almost always purchased locally. Models of the electrical and plumbing fixtures were frequently used and mock-ups of plumbing systems, electrical circuits, and heating and air conditioning systems were developed for the girls to see how the different systems worked and how to repair those problems that most commonly occurred.

From the questions answered in the structured interview with several individuals teaching courses in Home Maintenance and Repair representing industry and education, and from the informal conversations with other individuals knowledgeable in Home Maintenance and Repair activities, the following conclusions were drawn:

A. That the outline, student activities, and discussions topics developed from the study should be edited, published and

disseminated as a curriculum guide for Industrial Arts Home Maintenance and Repair in the state of Missouri.

B. That all secondary school districts in the state of Missouri be encouraged to consider offering courses with learning units in Home Maintenance and Repair as a course basic in the teaching of career education for career guidance purposes and for skill development in these areas and occupations relating to the maintenance and repair of the home.

C. That these courses be offered on the high school level and the adult level, and to be offered as electives in Industrial Arts primarily for high school seniors and particularly high school senior girls.

The results of the study have caused the development of material from which a curriculum guide for Home Maintenance and Repair could be obtained for Industrial Arts courses.

A second proposal was then written to obtain funds for editing and publishing the curriculum guide. The content of the curriculum guide that was finally published included seven parts: Part I - Safety, Part II - Home Maintenance Tools, Part III - Home Construction and Design, Part IV - Home Plumbing Systems, Part V - Home Electrical Systems, Part VI - Home Climate Control Systems, Part VII - Automotive and Engine Service.

Part I - Safety was written as a separate unit because the committee felt that safety should be emphasized whether it was taught as a single unit or whether it was integrated into the course as a part of everything taught. In safety, as well as all other units, there was constant effort by the committee to include occupations and occupational information that could be legitimately discussed and studied in class as it relates to each part of the content of the course being taught. The committee felt that occupational orientation as it relates to every topic in an Industrial Arts course should be emphasized either as a possible choice as an occupation in the future or to learn enough about the occupation to know who to call to repair that which may be in need of repair in any part of the home.

Also included in the curriculum guide are course objectives, resources that include audio-visual material, books and charts, and recommended equipment lists that would be necessary to teach the content.

DRAFTING

AIAA. TH-3:30-1

THE ABC'S OF DRAFTING. Charles W. Bohr, Industrial Arts teacher, Blue Mountain Middle School, Orwigsburg, Pennsylvania.

The ABC's of Drafting is a transparency series designed for beginners in drafting. DCA Educational Products is the publisher of the transperencies. This program was developed on a middle school level, but is utilized successfully in high school, vocational schools and colleges throughout the nation.

These transparencies were designed to give beginners a basic understanding of drafting and to help them develop the variety of skills needed to make and read simple drawings.

Spoken words, written words, and drawings are three of the most often used means of expressing and recording ideas or giving direction. Many ideas of the shape of objects can be defined or expressed through spoken or written language only with the greatest difficulty. It would be extremely awkward and time consuming to write out all the details for building a house. Drawings are used to illustrate the details of objects which cannot be readily defined through the use of spoken or written language.

The orthographic illustration all make use of projection planes which help the student to visualize and learn the theory of drafting. The perspective illustrations make use of a simplified method of producing a realistic perspective drawing. Beginners can enjoy the pleasures of successful achievement.

All types of drawings, such as oblique and one-point perspective, are closely related. To help the student learn the basic theory and the relationships among the types, several illustrations compare types of drawings.

This set of transparencies has been developed and used successfully at middle school, high school, and college levels. The set includes 36 multicolored transparencies with 20 overlays and a comprehensive instructor's guide which give full explanations of classroom techniques which work. The guide can also be used as a student textbook.

Each of the three groups can be used as a semester course or as a mini-course. The program is also ideal for the schools where students are encouraged to work independently.

The basic theory of drafting is presented in logical order through a series of transparencies. They should be carefully studied by the students before they begin to work on the activity sheets. The activity sheets provide an opportunity to apply the theory of drafting to drafting problems.

The activities include five different approaches to drafting problems. They are defined as: (1)Sketch -Many of the activities include sketching on grid paper. (2)Trace-The drawing is complete. The student is to tape a sheet of tracing paper over it and trace all lines using the drafting tools. (3) Duplicate - The drawing is complete and is to be used as a guide. The student is to duplicate the drawing on another sheet. (4)Complete-The drawing is started. The student is to complete the drawing on the same sheet. (5)Original - the student is to make a drawing from oral to written instructions. He will not have a completed drawing to use as a guide.

ADVANTAGES OF THE ABC's OF DRAFTING - (1)A Unique Comparison - The illustrations and definitions compare the similarities and differences between the views of orthographic, auxiliary, and section drawings and the faces of oblique, isometric, and perspective drawings. This is a unique feature. (2)Realism-Block letters are used as the objects on most of the illustrations. (3) U.S. Customary or Metric System Applications-The series can be used with either the customary or the metric system of measurement. (4)Use of Grids - Many illustrations include the use of Orthographic, Oblique, Isometric, One-Point Perspective, and Two-Point Perspective Grids. Grids take much of the "busy work" out of a course in basic drafting. (5)Independent or Supplemental Use-These transparencies can be used independently by a teacher or student in a student centered type of program, or they can be used to supplement any basic drafting textbook. Used either way, these transparencies will help to simplify basic drafting concepts and they will encourage student participation and add excitement to classroom discussions. (6)Career Education Application-The series can be used as a general education exploratory activity or the series can be used in a pre-vocational or vocational program. General education would include industrial arts and art education programs. (7) Step-By-Step Approach-All procedures are clearly written and illustrated to help the students to visualize the drafting concept involved. (8)Simplified Perspective Drawings-The basic theory of perspective drawing is presented in a simplified manner. (9)Easy to Understand - The information is presented using terms that are easily understood by all students.

SUMMARY

Students are very enthusiastic about the activities in the ABC's of Drafting. The transparencies and activities are a valuable teaching aid when used by either boys or girls. It has been especially rewarding to see middle and lower ability students obtain excellent results in accuracy and neatness. Given the opportunity, students tend to work independently on their drawings during class time and free periods.

ELECTRICITY/ELECTRONICS

AIAA. T - 3:45
ALTERNATIVES TO THE HIGH COST OF ELECTRONICS LABORATORY TRAINING EQUIPMENT. R. Dan Brook, assistant professor, Department of Industrial and Occupational Education, Mississippi State University, Mississippi State, Mississippi

Change in the electronics industry during the past decade has occured at a phenomenal rate. As a result of the introduction of solid state technology, the entire electronics industry moved into an era of rapid technological advancement. J. S. Kirby of Texas Instruments, developed the first integrated circuit in 1958. In doing so he did not realize how this technological advancement would instigate an electronic revolution. The magnitude of this impact was exemplified by the fact that Kilby was awarded the "Medal of Science" by the President of the United States in 1970. The effects of this contribution on the market are best illustrated by the introduction of the hand-held integrated circuit electronic calculator. The drastic reduction of size, weight, and cost of this product illustrates three of the major advantages of integrated circuits and the reason for the industry shift to this technology. As a result, the semiconductor market of today revolves around IC technology.

When one compares education's rate of change to that of industry, a vast difference will be found. Educators have found it increasingly difficult to stay abreast of technological advances, especially in the areas of electronics. This is not a new problem in education. Back in 1966, Schmitt and Pelly conducted a nationwide study and concluded that staying abreast of technological advancements and applying modern concepts of industry to teaching were two of the major problems confronting industrial arts teachers. These existing conditions in education are a result (in part) of the high costs involved in up-dating programs and equipment. The rising costs of utilities and inflation has done nothing but compound the problem.

There have been several studies which surveyed industry to identify new electronics concepts that should be taught in industrial and vocational electronics courses at various educational levels. Both industry and electronics educators have recommended and placed the highest priority on the following integrated circuit instructional areas: (1) introduction to integrated circuits, (2) digital integrated circuitry, (3) linear integrated circuitry, and (4) digital and linear integrated circuit applications. If our industrial education programs (including hardware and software) are to be relevant and remain viable, we must make a concerted effort to keep them up-to-date. This alone is more than a man-sized job.

When you quickly review the latest edition of the Electronic Market Data Book, you will discover just how rapidly the electronics industry is moving toward IC technology. Between the years 1966 and 1972, the factory sales of integrated circuits were reported to have increased from 13.4 percent to 49.3 percent of the total solid state component sales. During this same period, transistor sales dropped from 44.3 percent to 24.6 percent of the total component sales. Today we can see the results of this change in emphasis of the electronics industry when we shop for new appliances, such as the microwave oven. New automobiles are being driven down our highways with a silently humming microprocessor monitoring and controlling engine performance to exacting standards. One can only guess what the future holds. Indications are that this trend can be expected to continue at an ever increasing rate.

Industry has recommended that industrial education programs include

laboratory activities which include the latest advances in electronics technology. This seems to indicate that industry feels that laboratory activities are very worthwhile and should be used to facilitate learning. In addition, educational research has established the fact that laboratory training systems (hardware and software) are one of the most valuable education vehicles which can be utilized in teaching electronics. A review of past research has produced hard data to support the use of training systems far beyond the point of speculation.

Although industry and education have recommended and placed a high priority on new electronics concepts that should be taught in our programs, many educators have found it difficult (if not impossible) to follow through with these recommendations. To do this would require expenditures from budgets which are already being stretched beyond belief. However, if our programs are to depict that which is occuring in industry and thus properly prepare our youth of today for the real world of tomorrow, then we as electronics educators must meet these problems without delay.

It appears that educators have ten alternatives to combat the rising costs for teaching the latest electronics concepts in the laboratory. These alternatives include: (1) purchase complete sets of commercial electronic laboratory training systems to outfit the entire laboratory on a basis of two students per system, (2) lease or rent laboratory training equipment along with the necessary test equipment, (3) acquire equipment and trainers from state surplus property centers, (4) contact other state and national agencies to set up a possible long-term loan for their excess of "never used" equipment, (5) contact local and regional industries as well as equipment manufacturers and make arrangements to acquire or have donated equipment that has been phased out of service or junked, or even possibly supply part of their needs on a promotional basis (model program, etc.), (6) purchase partial commercial training systems and adapt it to their program needs, (7) purchase a commercial training systems on a "one-a-year" basis until the entire laboratory is complete with training systems for every two students, (8) continue to use that equipment presently on hand and forget about teaching the latest electronics concepts, (9) restructure their courses to exclude any and all types of student-oriented laboratory activities, or (10) design and construct, with the aid of their students, a laboratory training system that meets their specific needs and falls within the constraints of the budget. Can electronics educators have their cake and eat it, too? By all means, yes !!! After considering all alternatives carefully and reviewing the budget, several alternatives can be screened for the best approach to combat the high cost of electronic laboratory training equipment and at the same time maintain high standards in the program.

Ideally, it would be nice to purchase a commercial training system which meets all needs in both hardware and software. However, few budgets can stand such expenditures to provide every two students in a program with a complete system. Therefore, the next best alternative is that of designing and constructing a system to meet program needs. By involving students as part of the learning process in the design and construction stages, an instructor will soon realize the benefit produced for all concerned. This approach, which has more merits than not, should be strongly considered by all electronics educators who find the pressures of advancing technology pushing down their doors.

AIAA. TU-9-10:30
ANALOGIES USEFUL IN EXPLAINING SOLID STATE DEVICE THEORY. Robert F. Dorner, assistant professor, Department of Industrial Education and Technology, Montclair State College, Upper Montclair, New Jersey.

Industrial Arts students seldom have a background in theoretical science and mathematics. The typical student is likely to have experience with woods, metals and plastics, however. He/she might have taken a general science or shop math course, but as studies by Bowman[1] and Coleman[2] indicate, few Industrial Arts students have studied advanced mathematics, e.g., calculus and trigonometry. Such courses, in fact, are not required for admission to many college level Industrial Arts programs. Most Industrial Arts students are simply not knowledgable about theoretical science and mathematics.

Industrial Arts electricity and electronics has evolved from an elementary study of lamps, batteries and switches to a highly diversified theoretical study imvolving complex physical science principles, the understanding of which is aided by knowledge of advanced mathematics and science. Nearly all electronic devices base their function on solid state components. New special diodes, transistors and highly complex integrated circuits appear on the market everyday. The incorporation of these devices into automobiles, cameras and washing machines as well as more traditional uses in television, radios and calculators necessitates the clear presentation of solid state components in the Industrial Arts electronics classroom.

The problem of understanding solid state components is two-fold. First, bits and pieces of basic information about solid state technology must be selected and presented to build an understanding of all solid state components. Additionally, students with weak science and mathematics backgrounds must be helped to understand solid state technology.

Some productive, significant work has already been done on the first problem. The job of sifting through solid state technology and producing transferable basic concepts necessary to understanding solid state devices has been attempted. In many cases, authors of solid state device theory texts have succeeded in identifying basic solid state component concepts. These texts generally devote one or two introductory chapters to presenting physical science principles that are necessary for comprehending later chapters that deal with various diodes, transistors, etc. A partial list of these physical science principles might include drift current, diffusion current, recombination, hole flow and solid state ionization.

Once the physical science principles have been identified, the problem of clearly presenting them to students with weak theoretical science and mathematics backgrounds must be addressed. In the past, analogies and/or models have been useful in explaining basic concepts in electricity. Water flow has been used to explain electric current, for example. The Mr. Wizard television show in the 1950's employed simple models and analogies to explain applied science devices to young children. Similarly, models and analogies can be powerful teaching tools for portraying physical science principles to Industrial Arts students who lack theoretical mathematics and science backgrounds. Analogies are especially helpful as their use eliminates the necessity for a strong mathematics and/or science background to understand physical science principles.

A sample analogy and antecedent physical science principle with shared attributes follows.

PHYSICAL SCIENCE PRINCIPLE	ANALOGY
Recombination (across a PN junction) Non-biased--- As N (electron) carriers move into P region P (hole) carriers are filled and eliminated, likewise, P (hole) carriers move into N region and eliminate N (electron) carriers. A depletion region is developed and conduction ceases.	Checkerboard As the game is played red and black checkers jump each other and the game finishes when board is depleted of checkers.
Reverse biased--- If a voltage source is connected + to N region and - to P region the depletion region is widened as the P (hole) carriers and the N (electron) carriers are drawn away from the junction	If the game is played and the back row of black and red checkers are held in place the game will be over sooner.
Forward biased--- If a battery is connected + to P region and - to N region the on-going recombination continues as P (hole) and N (electrons) are reintroduced by the battery.	If as checkers are jumped and removed from the board, they are replaced at their respective sides of the board the game will continue.

FOOTNOTES

1. Bowman, James E. "A Study of the Basic Mathematical Skills Needed to Teach Industrial Arts in the Public Schools," unpublished dissertation for the Ed.D., Michigan State University, 1958, 78.

2. Coleman, Wayne D. "Physical Science Understandings Important to the Education of Industrial Arts Teachers," unpublished dissertation for the Ph.D., Colorado State College, 1966.

Th-2:30-2 2:30-3:30 AIAA Special Interest Session
Curriculum Development in Electricity and Electronics by
William E. Dugger, Jr. and Dale R. Patrick

Anyone that has had to teach a class in electricity/electronics will readily agree that it represents one of the most unique substative areas of the entire industrial arts discipline. The uniqueness of this area of instruction has prompted Dr. Dugger and myself to share with you one of the things that a number of our associates have been discussing for years.

Electricity/electronics and industrial arts in general has gone in so many different curriculum changes in the last few years that our teachers in many cases are thoroughly confused. Teachers, in general, do not know which approach to accept, which obviously poses a very serious problem when it comes to any logical form of organization and implementation.

Since my association with this organization there has been a number of different approaches all seeking to identify a curriculum. Essentially these center around four major headings: the industrial centered approach, technology, individual or student-centered approach, and the career oriented emphasis. As a profession, we are very divided on these ideas and still seeking an answer as to the primary source of our content.

To solve this dilemma, we must settle down and identify the primary source of our content and then establish a rationale that will permit us to achieve it.

Curriculum problem #2 is one of tradition. Electricity/electronics has unfortunately been strapped with some educationally unsound traditions through the years. These traditions as a general rule tend to restrict or limit the learning process.

Math, for example, is commonly used as a substitute for a good explanation instead of a tool.

The project is also an IA tradition. They should not be used at the expense of the student because they reduce teacher preparation time, or make class administration easy. Projects are often very time consuming, not particularly relevant to the subject at hand, and in many cases very costly. In essence, project selection must be weighed more for its educational merit than it ever has been in the past.

Some of the course content of electricity/electronics is also very traditional. Housewiring, electronic servicing, motor rewinding, and appliance repairs are prime examples. We must look very critically at the relevancy of these content areas with respect to their vocational implications in an industrial arts curriculum today.

Curriculum Problem #3 relates to Technology. Advances are being made so rapidly in the field of electricity/electronics today that it poses a serious problem in curriculum development. In this regard how quickly should new advances be implemented into a program and how does a teacher keep up with these changes?

Teachers need to show more interest in the field and take some personal initiative to solve this kind of problem.

Curriculum Problem #4 is one of communication. The theoretical nature of our course content is the primary basis of a problem of relating to communication. As a general rule, the entire process of communication is method oriented. Essentially, this problem deals with the effectiveness of our methods in communicating with students.

To elaborate on this problem, I would like to use a rather common computer concept. In this regard communication is a process of encoding, sending, receiving, and decoding. The first two items are indicative of the teachers role and the last two describe the students function. The real problem with our methodology today is how to encode and send something so that it can be effectively received and decoded. As a general rule, this problem tends to be more related to sending than receiving. Encoding and sending decisions are usually more sender experience oriented which is not particularly meaningful to the receiver.

To solve this problem, we must be able to recognize a usable level of presentation and relate to things that are in the realm of a student's experience.

Implementation is the fifth curriculum problem. The implementation phase of a curriculum relies very heavily upon instructional methodology. In this regard, the method that we choose to use serves as a vehicle through which we try to bring about a behavior change in our students.

Because of the theoretical nature of electricity/electronics, instructional methodology tends to lean rather heavily today in the direction of the experimental approach. This approach is implemented by providing the student with software that will serve as a directive in performing the experiment. Hardware packages are then needed to perform the manipulative part of the experiment.

The hardware and software used in an experimental oriented program are either commercially prepared or teacher prepared. Because of the time factor, most of the software that we use comes from published manuals. Teachers simply select the things that they want to do and use them accordingly. This piece-meal approach has its merit, but generally it may miss the main thrust of a well planned program.

The hardware part of the experimental method is where the hangup really occurs. Teachers usually feel that they are not committed enough to an approach to merit the investment. As a result, they simply do only those things that are permissible in the confines of their laboratory.

If we are committed to the experimental approach, we should feel comfortable in justifying it for the program. I think that our equipment acquisition priorities tend to favor the traditional areas of woods, metals, and drafting more so than electronics.

Assume now that you have convinced the school board or division director that you need to purchase an experimental hardware package. What then are the things that you need to take into account when selecting a hardware package? Educationally consideration should be given to such things as content breadth vs. depth, administration procedures, evaluation, philosophy, motivation factors, experiment time, and a teacher's guide.

There is also a number of physical factors that must be taken into account when selecting a hardware package. Cost is the most obvious. We must also need to consider the quality of the equipment. Inexpensive packages generally suffer from quality problems. Are replacements available, does the supplier assist you when problems arise, and do they stand behind their product after you receive it. I also firmly believe that equipment appearance makes a difference. It should have a pleasing appearance that fits into the general scheme of the laboratory.

ELEMENTARY SCHOOL I.A.

AIAA. T-7:00-8:00 P.M.
ELEMENTARY INDUSTRIAL ARTS: A PRACTICUM EXPERIENCE IN TEACHER EDUCATION. Jack W. Wescott, Assistant Professor, Industrial Technology Department, Fitchburg State College, Fitchburg, Massachusetts.

The purpose of this presentation was to provide a rationale and description of the elementary industrial arts class which is offered through the Industrial Technology Department at Fitchburg State College. The course is designed specifically for students who are pursuing a four year teacher education curriculum in elementary education and/or industrial arts education. Students in this course receive experiences at the McKay Campus School relative to the organization, integration and implementation of industrial arts activities with normal elementary classroom instruction in order to enhance the total educational development of the child. Additional instruction is provided which relates to the tools, materials and processes applicable for elementary industrial arts activities.

It is the intent of this course, that the prospective elementary teacher will be able to:

1. Describe the potential role of industrial arts activities in the elementary school curriculum.
2. Develop a rationale for elementary industrial arts based upon the individual needs of the student.
3. Define the term "developmental task".
4. Identify the developmental tasks of the elementary student relative to a specific developmental stage.
5. Describe the role of the classroom teacher relative to an elementary school industrial arts program.
6. Specify a set of criterion for the selection of an elementary industrial arts activity.
7. Organize, develop and implement construction activities which relate to a specific instructional episode.
8. Contrast and compare the unit and project approaches to teaching elementary industrial arts.
9. Describe the relationship of industrial arts to career education.

The content for this course is organized into three major sections. The sections are as follows: (1) orientation, (2) construction techniques and (3) practicum experience.

The major emphasis of the orientation section is to provide the prospective teacher with a viewpoint towards elementary industrial arts. More often than not, the student enters the course with a viewpoint of industrial arts which is predominantly based upon his/her experiences at the junior high and/or high school levels. As a result, they often perceive industrial arts as a separate distinct pre-vocational program designed to provide the student with specific manual skills related to materials, such as wood and metal. However, the viewpoint expressed within this class is that elementary industrial arts should assume an interdisciplinary role. That is, industrial arts as a method of instruction has the potential to make an effective contribution to a wide variety of subjects included within an elementary school curriculum.

Instruction presented during this section also includes: a

historical background of elementary industrial arts, the development of a rationale for elementary industrial arts and organizational patterns of contemporary programs.

The second section of the course deals with construction techniques and processes. The four major types of construction covered are: hollow block, solid block, armature and frame. Instruction in the form of demonstrations and related lessons are given on the materials, supplies and tools commonly used in the specified construction techniques. Additional information is presented on specific methods of instruction relative to the teaching of a psychomotor task.

During the third section of the course, the students are required to plan, organize and implement an industrial arts activity with an elementary class at the McKay School. Working within small groups, the students have the opportunity to actually teach the industrial arts activities which they have prepared. Furthermore, this practicum experience provides the prospective teacher with the opportunity to interact with elementary students and develop an understanding of their learning characteristics and needs.

In summary, the course is organized into three major sections. The first section involves an orientation to industrial arts in the elementary school. Special emphasis is directed toward a viewpoint, which is based upon an interdisciplinary approach. During the second section, the students are introduced to basic tools, materials, processes and construction techniques. The third section involves a practicum experience which allows the prospective elementary teacher to actually implement an industrial arts activity with elementary students.

ENERGY

AIAA T-2:30-4.
WIND ENERGY CONVERSION SYSTEMS - A COMPONENT OF A COURSE OF STUDY IN POWER PRODUCTION SYSTEMS. Martin Greenwald, assistant professor, Department of Industrial Education and Technology, Montclair State College, Upper Montclair, New Jersey.

That the wind will play a role in future energy scenarios is a certainty. Although there are no precise figures projecting future contributions of wind energy to the total energy production complex, wind energy will play a role of significance. The wind, it appears, is once again capturing the imaginations of many people, most noticeably within the past five years. The number of colleges and universities offering courses in wind energy machine construction, installation and repair continues to increase as people become aware of the possibilities of supplementing utility bought electricity with on-site small scale wind generators as well as utility sized machines operating in the megawatt range.

From the standpoint of industrial education, the study of wind energy is ideal subject matter, lending itself to interpretation on both the lecture and laboratory level. Individual and group projects have been completed in prototype coursework that provide students with both the theoretical and practical knowledge of wind energy conversion systems (WECS). Such knowledge helps to prepare students for critical energy choices to be made in the near future. The object of such coursework is not to build energy systems of commercial size or reliability, but to use such systems to enable students to gain insights into components and features of wind energy conversion devices that set them apart from other power conversion schemes. To date, this coursework undertaken by the author has been received enthusiastically by students. Coursework to be undertaken this semester will culminate in the erection of a 2 kw residential wind generator tied into the local utility grid utilizing a synchronous inverter for direct feedback of wind generated power into the electric distribution grid of the college.

What follows is a suggested, condensed guideline for the implementation of a course of study for the teaching of wind energy conversion systems. This outline can be modified to become one component of a larger powers sequence, or expanded with suitable emphasis and laboratory experiences to become a self-sufficient course of study on either the secondary or post-secondary level.

WIND ENERGY CONVERSION SYSTEMS (Suggested Course Outline)

A. Historical Analysis of Wind Energy
   1. Persia to NASA
   2. Present-day availability of commercial and homebuilt designs
B. Wind Considerations and Site Selection
   1. Wind measuring devices, manual, electrical, microprocessing
   2. Local topography, obstructions, etc.
   3. Betz' theory of maximum efficiency
   4. Power available from the wind: Law of the Cube
C. Classification of Wind Generators
   1. Horizontal and Vertical Axis Designs
   2. Wind machines for doing work or providing electrical power
   3. Upwind and downwind designs
   4. Hybrid wind devices
D. Mechanical Design Features of Wind Plants
   1. Design as a cor ollary of function and use

2. Wind plant materials (wood, metal, fiberglass, plastic, etc.)
3. Efficiency/cost: maintenance, vibration, degradation
4. Blade design and types
   a. Aerodynamic design and operation
   b. Blade analysis and manufacture
5. Control Systems
   a. Weatherproof housing
   b. Center-of-axis and off-center tail vane design
   c. Speed governing devices
      1. Manual brakes, flyball governors, centrifugal governors, servo controls, airbrakes, feathering mechanisms
6. Hardware: gears, pulleys, springs
7. Direct drive vs. step-up mechanisms
8. Tower design and analysis
   a. 3 leg, 4 leg, cylindrical, octahedron, guyed and self-supporting
   b. Tower materials: wood, metal, pipe, etc.

E. Electrical Conversion, Storage Systems and Controls
1. End uses: battery storage, AC feedback, electrolysis, air compression, etc.
2. Generators and alternators
3. Overload protection devices
4. Storage batteries
   a. Battery rating systems, life-time and cycle calculations
   b. Battery types: lead acid, nickel-cadmium, deep-cycle, etc.
5. Control systems for generators
   a. Voltage and current regulation
   b. Breakers, fuses, lightning protection
   c. Surging controls
   d. AC and DC system differences
   e. Homebuilt and manufactured control boxes
6. Synchronous inversion techniques: theory and practice

F. Bibliography: A full list of required texts may be obtained by writing to the author. In addition to the bibliography, a full course outline and related literature will be forwarded.

CONCLUSIONS

The treatment of energy in the public schools is complicated by many factors outside the classroom. In spite of this often confusing picture of energy studies, basic trends in future energy sources are becoming apparent. What is most bothersome about such trends is that present industrial education curricula largely ignores the future, at least officially, and is based in the past, wedded to fossil fuel technology. If we are to be successful in what we do, namely provide our students with the knowledge to understand the implications of the options before them, and to be competent to help shape the future based upon these options, we must not simply mirror industry and society in what we teach. To ignore such implications is to contribute to the problem. We must be a discipline that can discern future trends and act upon them in the present. The implementation of a wind energy course of study is, of course, only a small step in this direction, but an important one, since it is a step out of the past and into the future.

AIAA. T-9:00-5.

SOLAR ENERGY CURRICULUM. James E. O'Bannon, Associate Professor, Department of Industry and Technology, California State University, Chico, Chico, California.

Most experts agree that solar heating and cooling is past the age of technical infancy and has now become a viable industry. The Sheet Metal and Air Conditioning Contractor's Associations are predicting an increase of 15,000 jobs and two billion dollars a year in solar business by 1990. The Department of Energy (D.O.E.) is predicting over 200,000 solar housing starts by 1985 (Riendeau-1976) and if solar retrofits and passive solar systems were added to the list of predictions, the number would be staggering. Thus, it is imperative that industrial educators in secondary public schools and community colleges begin to (1) modify the content of technical specialist training courses and (2) revise the existing consumer awareness courses to include the emerging and existing technology of solar energy.

Many community colleges throughout the U.S. are aware of this need and have begun to implement solar energy courses. Other colleges are anticipating starting new programs to include this rapidly emerging technology (O'Bannon-1977).

To provide occupational information and data to be used in upgrading a validating solar program/courses, California State University, Chico conducted a study which was designed primarily to identify those competencies required of individuals to install and maintain solar systems (Hunt-1977).

The study revealed that the solar industry is a multi-faceted one with an exponential growth rate. The task and job requirements for individuals working in the solar energy industry is also diverse, with jobs ranging from assembly line workers to solar engineers. This diversity and growth has caused a tremendous manpower shortage within the industry. The greatest manpower problem appears to be the lack of trained personnel to install, start-up, operate and size solar systems. Such specialists are usually referred to as:

Solar Mechanic - a person that possesses those competencies which are necessary to install and maintain solar energy equipment and,

Solar Technician - a person who possesses those competencies which are necessary to install, maintain and size a solar energy system.

Job Description and Task Requirement. The study identified over 200 minor tasks that were required of, and shared mutually by, both the Solar Mechanic and the Solar Technician. Ten tasks unique to the Solar Mechanics and ten unique to the Solar Technician were identified and rated as functionally important by respondents. The tasks for each occupation are listed in rank order below:

Solar Technician

Read blueprints and schematics
Calculate heat loss/gain
Size collector array
Prescribe appropriate controls
Size storage; water type
Sketch systems
Perform supervisory functions
Trouble shoot control systems

Size pumps, piping, (rule of thumb)
Size solar assisted heat pump

Solar Mechanic

Install and wire controls
Read blueprints and schematics
Cut and join plastic pipe
Install collectors
Maintain and repair collectors
Maintain and repair plumbing
Install heat pumps
Cut and braze copper fans
Install prefabricated sheet metal components
Construct rock storage systems

Any curricula designed for Solar Mechanics and Solar Technicians should be designed in such a way that each student will be afforded the opportunity to develop those competencies needed to accomplish the above tasks.

Interfacing With Existing Curricula. The occupational task-based Solar Mechanic and Solar Technician curricula must be competency oriented as well as flexible. It must be flexible enough to stand alone or to be interfaced with, existing related curricula such as:

Heating, venting and air conditioning technology
Hydronic (plumbing, boiler technology, etc.)
Building construction technology

This interfacing is vital because most Technicians and Mechanics are involved in one of the above occupational areas along with their solar work. Fortunately for the industrial educator, the interfacing of solar curricula with existing curricula has the advantages of (1) maximizing the use of current facilities and (2) developing continuity and unity with current curricula.

Move Or We Shall Be Moved. Industrial educators must begin this interfacing by (1) adding new courses and/or (2) modifying existing courses, if they wish to continue supplying industry with needed technical personnel. If students are not allowed to develop those competencies deemed important by the solar industry, the industry will eventually develop their own training programs as is evident by the Laborer International Union of North America Local 89, Training Program in San Diego and The State of California's Office of Appropriate Technology, Solar Mechanic Training Program in Sacramento.

Industrial educators must join forces with private industry and government in solving both our energy and manpower problems.

Hunt, W.D. Solar Technicians and Mechanics: A Preliminary Occupational Task Analysis, 1977, California State University, Chico, Chico, California--an unpublished Mater's thesis.

O'Bannon, J.E. Donoho, R., Hunt, W.D., Energy Conservation and Alternate Energy Curriculum, 1977, California State Energy Commission.

Riendeau, A.J. "The Energy Crisis is Real and You Can Do Something About It." Industrial Education, September 1976, p. 9-10.

AIAA Tu' 10:45-2
ENERGY-ENVIRONMENT SIMULATOR Douglas L. Polette, Associate Professor Department of Agriculture and Industrial Education, Montana State University, Bozeman, Montana

Today a significant number of people are starting to realize that we do not have an infinite supply of easily available energy. The American people are gradually realizing that some very hard decisions must be made about how to use our remaining non-renewable resources. A major problem is informing the citizens of this country about our national and world energy situation so they will be able to make logical decisions that will affect our national energy policies. The Energy Research and Development Administration (ERDA) is making a determined effort to provide the citizenry with the necessary background for making logical decisions on energy matters. In response to this need a Montana State University Professor, Dr. John Amend, developed the interactive analog computer (Energy-Environment Simulator) as a model of the total energy situation of the nation and the world. The Energy-Environment Simulator is a type of game where groups in the audience participate and interact with the computer. The computer gathers information from remote control panels, located in the audience, assimilates this input and displays the decisions in reference to the total energy available, the population, the standard of living, the energy demand and the environmental impact. The players continuously interact with the simulator as it adjusts the various energy reserves in relation to the input of the players. Although there are no correct answers, the major objective is to provide a reasonable standard of living for the longest possible period of time in light of the growing energy demands on the earth's dwindling energy supplies.

The Energy-Environment Simulator may be broken down into several functional areas, see figure 1.

A. Years Elapsed--The amount of time that has passed in a particular game. This can be calibrated in 25 or 100 years per minute.

B. Energy Resources--This particular section of the simulator is programed with the latest information available on known reserves of coal, petroleum, natural gas, hydroelectric, nuclear, and new technology such as solar, geothermal, etc. The computer calculates the remaining amount of reserve available in each resource in relationship to how much has been used. Warning lamps are displayed on the panel when these reserves are getting low, a buzzer sounds ending the game when they are depleted.

C. Environmental Impact--This portion of the simulator provides an indication of the quality of our environment. The computer senses when we are using large quantities of resources that presently have high pollution factors and displays this information on the environmental impact panel.

D. Energy Demands--This section of the computer categorizes our demand for energy into four sub-areas; Industrial, Transportation, Household and Commercial, and Agriculture. These categories can be programmed into the computer in direct relationship to their present use.

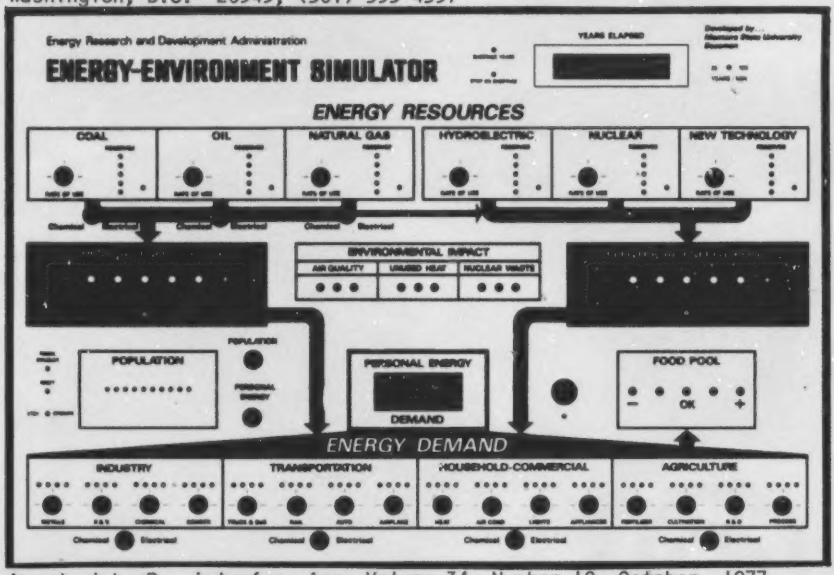
E. Energy Pools--This section provides the players with information on how the particular resources may be used, either in the form of chemical energy and resources or electrical energy. This function is displayed on the panel in a series of lights that indicate the balance between the two pools.

F. Personal Energy Demand--This section further breaks down the energy demand function into personal energy used as it relates to our

standard of living. The number displayed can best be described as the average per capita calorie usage of energy for the population.
G. Population--The growth of the population is displayed by a series of lights. The rate of growth may be adjusted to desired levels.
H. Food Pool--This section displays a balance that must be present to provide enough energy in the agricultural sector to provide adequate food to support the population.

By careful manipulation of the various areas the audience becomes aware of the many problems relating to energy, its use, and environmental impact. Thus, through this simulator, individuals and groups can gain experiences that provide a background for dealing intelligently with our country's energy problems.

Currently there is at least one simulator located in each state, generally at a college or university. As a public education activity of the Energy Research and Development Administration these simulators, along with a trained individual, are available to interested groups. To obtain a list of locations of the simulators you may write to: Office of Public Affairs, Communications Services, U.S. Dept. of Energy, Washington, D.C. 20545, (301) 353-4357



Amend, John R., Interface Age, Volume 34, Number 10, October, 1977

Melcher, Joan, "The Energy/Environment Simulator", Interface Age, Volume 34, Number 10, October, 1977

Scientific American, Volume 224, Number 3, September, 1971. The entire issue is devoted to energy and power.

AIAA. T-10:45-12.

ENERGY EDUCATION IN INDUSTRIAL ARTS. John W. Sinn, Training Associate, Technology Education Program, West Virginia University, Morgantown, West Virginia.

Recently, the need for exposing individuals to our technological world as it relates to energy has become increasingly apparent. The extent that energy is an ever-increasing contingency in our industrial-technological society, and the numerous critical energy related questions to be faced by individuals in the near future, solidly justifies energy-based, general educational endeavors. It is quite possible that increasing numbers of industrial arts educators, by virtue of our unique understanding of the mechanical-industrial-technological world, may be called upon to assist in this energy-based delivery in schooling situations.

If it can be accepted that 1) industrial arts education is in an appropriate and workable position to deliver education representative of our technological world as it relates to energy; and, 2) industrial arts education may be called upon to disseminate energy-based information, then, several significant questions are noted and must be dealt with. Although several major questions are prevalent, the single most important question may be relating to strategies best suited for industrial arts educators to disseminate energy-based knowledge.

A strategy which can be successfully used by industrial arts educators to introduce individuals to energy technologies related to the mechanical-industrial-technological world, is accomplished in the following three phase process: I) acuaintance period; II) technological modeling; and, III) problem solving. Although the strategy as briefly outlined in the following writings is introductory level, appropriate for both secondary and college students, with modifications it could be applied to multiplicities of teaching circumstances.

Phase I, at the outset, serves to introduce and overview the total course, followed by activities and experiences which: 1) provide a common knowledge and experience base relating to energy tools, techniques and systems evolution, current state and future projections; and, 2) provide a developmental transition toward phase II and III activities involving modeling and problem solving. Phase I, involving approximately one-third of the total course time, will be accomplished through instructor presentations, group discussions, course resources exploration and hands on activities. Topics addressed in this foundational phase could include energy: defined; purposes; sources, systems and their evolution and future projections; use implications, effects and impacts on humankind, natural resources and the environment; conservation; and perhaps others. "Hands on"acquaintances might include exposures to past, present and future energy sources and systems (or their application) through written exercises, disassembly and reassembly of mechanical objects, or other activities involving energy technologies tools, techniques or systems and their components. A sequential rotational methodology (students move from station to station) employed during phase I will facilitate optimum student interaction with each energy tool, technique and system. It is significant to note, although there will be several weeks of interconnected hands on activities progressively organized toward upcoming phases II and III, the emphasis will be on "hands on" acquaintances to principles and concepts as opposed to skills, vocations, or specific mechanical competencies.

Phase II, building on phase I foundations, will permit students a

"close up" view of energy technology, from any era, by requiring a single energy tool, technique or system reproduction, in model form. The models could be full or not-equal in size and functional or non-functional. Possible model pursuits and/or topics appropriate for phase II, to be covered either through student activities and experiences or through instructor presentations could be: past, present and future energy sources and systems; alternative energy sources and systems; and, energy production, conversion, transmission or utilization systems. Much latitude will be provided for diversities of student interests and needs, and much flexibility will be permitted to encourage optimum student productivity (e.g. use of class time away from class, arranged visitations, etc.). However, even though much flexibility and latitude will be incorporated, the instructor will encourage a fair representation, by groups or individuals, of all major energy source and system types, and, all eras of energy technology evolution. Again, during phase II, pertinent energy related discussions, presentations, demonstrations, and, course resources assignments and utilization will be undertaken, when appropriate, for student "horizon broadenings".

Phase III, problem solving, is positioned to be the culmination of all past course information, activities and experiences. Students, either individually or in small groups, will identify a problem related to current energy technology, plan a means to resolve the problem, and pursue the plan within the final one-third of the course time remaining. Appropriate problem endeavors to be encouraged by the instructor might be: pollution; natural resources use/abuse; energy production, conversion, transmission, utilization or efficiencies; appropriate energy alternatives; humankind associated problems; environmentally associated problems; energy costs; and perhaps others depending on circumstances. Methods for dealing with problems might include library research, 'hands on' research (visitations, surveys and/or observations), experimentation, construction of an alternative, or perhaps others. Again, students will be encouraged to represent all types of energy technologies in their varied problems and approaches, with regular time intervals identified for appropriate group sharing experiences emphasizing individual project status and achievement. Continued course resources assignments and utilization, as well as brief student and instructor demonstrations and presentations pertaining to energy problems, will be undertaken during phase III.

AIAA TU 9:00-10:30-5 INSTRUCTIONAL STRATEGIES IN ENERGY TECHNOLOGY

Dr. A.E. Schwaller, Asst. Prof., Eastern Illinois University, Charleston.

Many of the schools within the field of Industrial Arts or more currently within the field of Technology Education are revising their curriculum to fit the systems approach or cluster concept. As part of this concept, one area that is significantly effected is the area of ENERGY. The move in education toward this concept is summed up by Toffler when he writes:

> "All education springs from some image of the future. If the image of the future held by a society is grossly inaccurate, its education system will betray its youth."
>
> (Alvin Toffler, 1974)

As society progresses, the awareness of energy within that society becomes then an extremely significant part of that society success. Because of this emphasis in society, many believe the solutions to the problems surrounding energy lie in the field of education. This is emphasized by Ralph V. Steeb, Industrial Arts Consultant, Florida State Department of Education when he writes:

> "The attitude and practices of the public must be aligned with the realistic data and world resources situation. Education stands foremost as the prime motivator of energy literacy."
>
> (Steeb, 1976)

Thus the signs indicate that energy should be a significant part of the secondary and college level classroom curriculum.

In order to implement an Energy Technology program into your school, consideration must be given to many aspects. Among them are: (1) Underlying philosophy, (2) Curriculum content, (3) Instructional strategies, (4) laboratory facilities, (5) existing constraints. The purpose of this presentation is to look specifically at the instructional strategies within an Energy Technology program. If a solid foundation is developed within this area, then development of the other areas and the immediate student needs have a better opportunity to be met.

Several areas have been considered a part of the instructional strategies used in an energy technology program. They are: (1) Learning theory, (2) Team teaching, (3) Lecture series vs. laboratory assignments, (4) Open laboratories, (5) Competency based activities, (6) Instructional media.

LEARNING THEORY: The first part of instructional strategies is the development of a sound philosophy in the area of learning theory. Learning theory must be considered because all of the activities that are planned within a curriculum should be aimed at methods in which the students learn the most effectively. Many learning theory psychologists such as Skinner, Piaget, Erickson, and Dewey, have offered appropriate theories to be used. You might select one or parts of all theories to be used in the classroom.

When teaching Energy Technology in the classroom, several learning assumptions should first be considered: (1) Problem-solving is very useful and should be a recommended activity. (2) Activity involvement will verify concepts. (3) Conceptual learning - Any problem-solving that is planned must be based on a strong conceptual background. (4) Cognitive level - Any information should be given at evaluation and synthesis level.

TEAM TEACHING: Team teaching is also a very appropriate instructional strategy if it is used properly. Team teaching, if used correctly,

can accomplish several major purposes within an Energy Technology Curriculum. (1) It enhances the strong points of each instructor. (2) It enhances the total amount of experiences which the student is exposed to. (3) It allows scheduled laboratories to be more meaningful to the students due to the variety of expertise. (4) It allows for less duplication of content.

LECTURE-LABORATORY RELATIONSHIP: Within the Energy Techonology program, much thought should be given to how the lecture and the laboratory experiences are related. (1) It should identify the social-cultural issues and implications of that particular energy topic. (2) It should examine concepts that can be applied to various areas within energy technology. (3) It should demonstrate skill development to verify concepts discussed in the lecture series. (4) It should give students concepts needed for a firm foundation to be used for problem-solving. (5) As indicated earlier, skill development should be considered in beginning level courses.

OPEN LABORATORIES: One of the most effective ways to consider the individual needs of the students as they verify concepts in the laboratory is by the use of an open laboratory. The open laboratories have several distinct advantages: (1) Students can work on skill development and problem-solving at their own speed. (2) Quality of laboratory experiences is improved due to availability of time. (3) Less tools are needed for a greater number of students. (4) Scheduled laboratory times can be used for demonstrations. (5) Laboratory assignments and skills are not sequential. (6) Students generate more motivation due to less pressure from the time element. (7) Students actually learn more due to the increased availability of graduate assistants and instructors.

COMPETENCY BASED ACTIVITIES: The fifth area to be discussed in instructional strategies is that of incorporating competencies within an energy program. These competencies serve several major purposes. (1) They meet certification requirements established from the state. (2) They prepare students to be competent in the total laboratory for further use in problem-solving. (3) They generate more student interest and students can gauge their progress relative to others. (4) The instructor can immediately gauge the students competencies for work in the open laboratory.

INSTRUCTION MEDIA: Instructional media should also be considered a part of the total instructional strategies. Instructional media can be very effectively interwoven throughout the entire energy program. (1) It can be used to enhance the lectures that are given. (2) It can be used to enhance the competencies. (3) It can be used during the open laboratory periods or during scheduled laboratory time. (4) The learning from mediated instruction can be controlled by the student at his or her own pace.

Steeb, Ralph V. "The Urgency of Energy Education." Energy and Power Journal. National Education Council on Energy and Power, P. O. Box 618, Concord, Mass. April, 1976.

Toffler, A. "The Psychology of the Future." A. Toffler (Ed.) Learning for Tomorrow. The Role of the Future in Education. New York: Vintage Books, 1974. p. 3

EVALUATION

AIAA. W-7:00-2

FORMATIVE EVALUATION: A MODEL FOR INSTRUCTIONAL MATERIAL DEVELOPMENT AND REVISION IN INDUSTRIAL ARTS EDUCATION.

Marvin I. Sarapin, assistant professor, Department of Industrial Education, University of Maryland, College Park, MD.

Introduction

The systematic development, revision, and assessment of instructional materials and procedures are perennial concerns of educators involved in the curriculum development process. Within the discipline of industrial arts education, continual efforts to improve instructional programs have materialized during the last two decades. Research and development have facilitated changes in the definition of the field, the curriculum base, the educational goals and objectives, and the teaching learning strategies employed by public school industrial arts teachers.

Alternative instructional content and teaching strategies have been delineated in state-wide curriculum guides developed in Hawaii, Iowa, Kansas, Maryland, Minnesota, Virginia, Wisconsin, and other states. However, "regardless of the process used for curriculum development, no curriculum is ever perfect, nor complete, nor can it remain static. Weak points and inconsistencies will continuously arise in even the most carefully developed program....The individual teachers, curriculum committees, and administrators should therefore strive to continuously evaluate and refine the industrial arts curriculum" (3, p.8).

Formative Evaluation

One particular strategy for guiding and monitoring efforts within the instructional material development-assessment-revision continuum is formative evaluation. As used here, "formative evaluation is the gathering of information which would be of use to the developers of instructional materials, those persons who are trying to choose or produce the parts, the elements which will combine to form the successful whole. Information of concern to developers is usually that which will help them determine the success of their initial efforts, so that modifications can be made" (1, p. 111).

Formative evaluation incorporates the collection and use of feedback to developers of educational processes and products. The purpose of these activities is to facilitate further assessment, revision, and improvement of instructional materials and other educational components during the formative period of development. Using formative evaluation procedures should be of concern to industrial arts curriculum developers because "the most immediate evaluation need of the developmental curriculum process is the feedback of information on preliminary

materials during the process of material preparation, to determine the general feasibility and to obtain clues concerning needed change" (2, p. 439).

Model Development

A formative evaluation model was designed (4, p.77) based on a review of evaluation literature. A four phase conceptual model communicated the curriculum development, evaluative, and feedback components essential to formative evaluation of instructional products.

Specified in the model were four developmental components: (1) identifying goals, (2) identifying objectives, (3) developing instructional materials, and (4) field testing instructional materials. Suggested in the model were four evaluative components: (1) assessing goals for worth and merit, (2) assessing objectives for worth and merit and congruence with goals, (3) assessing interim instructional materials for content and procedural validity, and (4) assessing emerging products as applied in classrooms and laboratories. In each phase of the model, decision making based on evaluation data provided feedback input concerning the need to adopt, revise, or terminate development of the instructional materials.

The formative evaluation model was field tested and revised, based on the curriculum development efforts of a graphic communications institute conducted at Iowa State University. The model developed was found to be a useful tool for communicating and promoting the understanding of the goals, roles, and procedures of formative evaluation in curriculum development. The application of the formative evaluation model assisted the public school industrial arts curriculum developers to identify educational goals, identify instructional objectives, develop interim instructional materials, and field test developed materials in the classroom.

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2. Grobman, H. Curriculum development and evaluation. The Journal of Educational Research, 1971, 64, 436-442.

3. The Iowa Guide for Curriculum Improvement in Industrial Arts, K-12: A Study of Industrial Technology. Iowa State Department of Public Instruction, 1975.

4. Sarapin, M.I. Formative Evaluation: A Model for Instructional Material Development and Revision in Public School Industrial Arts Education. (Doctoral dissertation, Iowa State University, 1977).

ACIAS, TU-3:15-4:30

STUDENTS EVALUATE THE CLASSROOM TEACHER. John E. Bonfadini, Supervisor of Vocational Education, Prince William County Public Schools, P. O. Box 389, Manassas, Virginia 22110.

Teacher evaluation is a fundamental element in the educational process. This process like many other phases of education has constantly changed over the past century. Even with this changing era the idea of client centered evaluation has failed to develop sufficiently to be considered a major part of the teacher developmental and growth process.

Recent trends in teacher evaluation such as the Mazoo Project used students' evaluations. Many colleges and universities actively incorporate student evaluations in promotional considerations of professors. The continual development of teacher evaluation data through the incorporation of more reliable instruments could open the door to the increasing use of students in assessing the educational environment.

This study attempted to modify existing proven rating scales for the specific evaluation of student teachers in the industrial arts area. The Purdue Instructor Indicator and the Western Michigan Teacher Image rating scales had proven reliability. Minor modifications made these evaluation instruments more subject oriented than the original documents. The total diagnostic and evaluation process incorporated both the forced choice and Likert type evaluation scales.

The need for continual research in teacher evaluation is obvious. More recent trends in having teachers and administrators establish teacher behavioral and performance objectives collectively created the need for further research into the method of evaluating outcomes. The beginning teacher's teaching traits and characteristics are extremely important to the local administrator assigned to the responsibility of establishing inservice programs for teacher improvement. Only through the process of research and evaluation can workshops be designed to effectively improve the beginning teacher. Through studies such as this, general and specific teacher characteristics of strengths and weaknesses can be identified through student evaluation. Programs of counseling or inservice workshops can then be developed to minimize the teaching differences in a shorter period of time. The student teacher who is afforded this feedback process should be better prepared to determine his own behavioral objectives for teacher improvement, which is commensurate with recent evaluation trends.

The student teacher who has participated in the diagnostic evaluation and counseling process should be more adequately prepared to chart his own teacher improvement course. This evaluation and counseling process can also provide feedback during the time in the learning cycle when effective teacher change can most readily be accomplished. During this period in teacher preparation the student teacher is also provided access to the greatest amount of individual assistance and expertise. Furthermore, it appears to be logical to use all indicators in assessing the learning environment surrounding a specific student teacher.

STUDENT TEACHER DIAGNOSTIC QUESTIONNAIRE

		IDENTIFICATION NUMBER
Middle School (1) High School (2)	1	
Group A (1) Group B (2)	2	
Student Teacher Number	3	
	4	
Cooperating Teacher Number	5	
	6	
College Supervisor Number	7	
Class Number (1) or (2)	8	
Male (1) Female (2)	9	
	0	

SET A	1. Has neat appearance	1			
	2. Knows subject matter	2			
	3. Listen to pupils ideas	3			
	4. Maintains neat lab	4	A	B	C D
SET B	5. Keeps good student records	5			
	6. Students willingly work for teacher	6			
	7. Enthusiastic about teaching	7			
	8. Uses good questioning methods	8	A	B	C D
SET C	9. Gives good demonstration	9			
	10. Has good discipline	10			
	11. Takes care of student projects	11			
	12. Good voice and speech	12	A	B	C D
SET D	13. Good sense of humor	13			
	14. Good application of safety rules	14			
	15. Knows how to use equipment	15			
	16. Gives each student an equal chance	16	A	B	C D
SET E	17. Comes to class on time	17			
	18. Course material interesting	18			
	19. Is fair in dealing with students	19			
	20. Students properly use safety glasses	20	A	B	C D
SET F	21. Students respect teacher	21			
	22. Grades students fairly	22			
	23. Shows leadership	23			
	24. Knows where everything is	24	A	B	C D
SET G	25. Tools well organized	25			
	26. Is courteous	26			
	27. Lessons well organized	27			
	28. Works with slower students	28	A	B	C D
SET H	29. Is dependable	29			
	30. Individualizes instruction	30			
	31. Enough supplies available for lessons	31			
	32. Has help sessions	32	A	B	C D
SET I	33. Has good clean up system	33			
	34. Achieves aims of lessons	34			
	35. Has good physical appearance	35			
	36. Communicates with students	36	A	B	C D
SET J	37. Shows poise and self control	37			
	38. Uses proper learning techniques	38			
	39. Gets things done on time	39			
	40. Never forces ideas on students	40			

The major evaluation device utilized in this study is a forced choice document designed to rate the individual teacher's characteristics in four categories: personal traits, professional competencies, pupil-teacher ratio, and classroom management. The rating instrument contains 40 items arranged in ten sets, A through J. The student is requested to indicate, in priority order, each of the four items in each set. Each set contains one item pertaining to the four above mentioned diagnostic categories. By summing across sets, a profile graph of the individual teacher can be developed which is utilized in counseling sessions to help improve those areas receiving the lowest rating.

AIAA. W-7:00-2

EVALUATING INDUSTRIAL ARTS PROGRAMS. W. J. Haynie, III, Research Assistant, Industrial Arts Education, The Pennsylvania State University

Many models for program evaluation are available today. Program evaluation goes much further than rating teachers and grading pupils. Examples of questions that program evaluation can help answer: What are the needs? What are the goals? Are the goals met? What non-intended outcomes result from the program? Is this program as good as other or previous programs? Is the program really implemented? Are techniques, methods, facilities, materials, equipment, and even the staff adequate? The model chosen in a given situation will depend, in part, on what questions need to be answered.

The most familiar model, a simple one, is the accreditation model. This model basically inventories the assets (equipment, materials, etc.) of a program. If the accreditation model alone were applied, an Industrial Arts program which taught nothing, but did so in a new, well equipped laboratory complex, could be judged superior to one which attained many goals and filled the needs of students well but was offered in a poorly converted basement. This is hardly a fair and useful evaluation.

If the programs cited above were both evaluated by a goal-attainment model, the opposite judgments would result. Goal-attainment models compare the outcomes of the program to the intended goals and objectives. When using a goal-attainment, or almost any program evaluation model, criterion referenced tests should be used instead of norm referenced ones. This is because the important information in program evaluation is how much the group learns, not how much more Johnny learns than his classmates.

Scriven (1972) suggests that a program may have important non-intended outcomes. Suppose a woodworking teacher has all students work with mahogany first because he feels it is easy to work, good looking, and suitable for most beginning projects. This seems harmless enough, but suppose his students infer that mahogany is the best, strongest, or cheapest of all woods! A goal-free model could find such peculiarities in a program. In a goal-free model, an outside observer is hired and not given any information about the objectives of the program. The evaluator probes deeply into the outcomes of the program from various angles. If the outcomes discovered are in harmony with the intended goals, then the program is a success.

Sometimes a program may have good goals and prescribed methods but may fail because teachers do not have faith in it and thus they ignore it and continue with their own "tried and true" methods. When this occurs, it can devastate a new program and its image. Systematic observation techniques provide a means for determining whether or not a program is really implemented. The systematic observation models of Withall (1949), Flanders (1963), and Ribble (1973) can help discover such problems. These models do not evaluate, they merely involve observing and recording what occurs in the program. The information gained by such observation could, however, be compared with the prescribed methods to see if the new program is really being given a chance to succeed.

Often, programs are evaluated as being good or bad without even considering competing or previous programs. Claiming that the new manufacturing technology program at Jones Junior High is better than the old general shop program it replaced without really comparing the two is not only foolhardy, but could be costly. Comparison is a

simple process and should not be overlooked as a strategy for program evaluation when similar programs are available.

Some comprehensive models, which may be advantageous because they use several of the above suggestions, do exist. The author recommends the CIPP Model by Guba and Stufflebeam, the CSE Model from UCLA, and the Discrepancy Model by Provus (Popham, 1975) as good models for comprehensive evaluation of large Industrial Arts programs. Each of these models has unique capabilities, limitations, and information requirements. The simple models mentioned earlier, with the exception of goal-free assessment, could possibly be used by program personnel themselves, but these more comprehensive models demand considerable sophistication on the part of the evaluator, thus the hiring of evaluation specialists is required.

Regardless of the model chosen, or the details of how it is used, evaluation of Industrial Arts programs is more than just a good idea -- it is absolutely necessary! Cost is an important consideration. Hiring a team of outside evaluation specialists and charging them to use a complex model such as CIPP to evaluate a one laboratory, one teacher, Industrial Arts program would be wasteful and senseless. However, a large city's complete Industrial Arts program could be complex enough to deserve and demand scrutiny by outside evaluators. The point of this is simple -- evaluation does not come cheap! Therefore, the evaluation needs of a program and the funds available should both be considered fully before deciding who will evaluate it and by what methods or models. It would behoove the Industrial Arts supervisor, and many teachers, to become familiar with the various evaluation models, their information requirements, techniques, and cost to use them.

We cannot afford to assume that what we do is always good, our programs are too expensive in these times of tight money to have such feelings of false security. We must evaluate our programs objectively and effectively, NOW! Discovering the relative strengths and weaknesses of a program is the first important step to improving it and insuring its growth.

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FUTUROLOGY

AIAA. TH. 3:45-5:00
THE THEMATIC APPROACH: A PROCEDURE FOR REVISING INDUSTRIAL ARTS UNDERGRADUATE PROGRAMS FOR THE FUTURE. Dr. Everett N. Israel, Professor, Industrial Technology Department, Fitchburg State College, Fitchburg, Massachusetts.

During the past six years, twenty faculty members of the Industrial Technology Department at Fitchburg State College have planned and implemented a major undergraduate curriculum change. The purpose of this report is to identify the procedure that was used plus some techniques in the hope that the procedure or a variation of it might help other Departments.

Curriculum change goes through three major stages: (1) the planning stage, (2) the implementation stage, and (3) the evaluation and revision stage. When a major change is made (revising a complete program) in an undergraduate curriculum the amount of change is dependent upon the ability of the faculty to change. At the implementation stage the decisions previously made in the planning stage become realities. At this point the faculty needs patience, guidance, and positive reinforcement.

Since the amount of curriculum change is dependent upon faculty change, the process takes time. At Fitchburg State College the faculty spent three years planning the curriculum change and, thus far, three years implementing the change. As of yet we have not entered the third stage, but expect to soon.

As a means for starting this process, the faculty elected a curriculum coordinator. The coordinator was given the power to form a Curriculum Coordination Committee. This Committee, after completing extensive research, formulated a general procedure for bringing about curriculum change. The procedure involved (1) determining curriculum assumptions, (2) determining a philosophical viewpoint, (3) identifying and diagraming a curriculum model, (4) identifying, structuring, and organizing subject matter, (5) identifying, structuring, and organizing learning experiences, (6) finalizing an overall program, (7) implementing and evaluating, and (8) revising.

Since launching the curriculum project is the most important step in the process, the Committee spent many hours determining short range goals for accomplishing the first two steps. This approach established an example of how the other major steps might be approached. The short range goals for the first two steps involved (a) identifying some assumptions about the future, (b) evaluating the present program to determine its strong points, (c) identifying the need for developing a philosophical viewpoint, (d) determining topics that need to be addressed in the formulation of a philosophical viewpoint, (e) reviewing the goals of the College and the trends in higher education, (f) reviewing trends in industrial education, (g) determining a strategy for formulating a departmental viewpoint, (h) planning faculty workshops related to c,d,e, and f above, (i) conducting faculty workshops, (j) conducting a philosophical survey, (k) conducting a workshop on the results of the philosophical survey and the on-and off-campus survey, (l) finalizing assumptions and outlining a philosophy, (m) writing a philosophy paper, and (n) faculty reviewing the

philosophy paper and making revisions. These 14 steps were PERTED on a chart.

Steps a through g, 1 and m were completed by the Curriculum Coordination Committee with the assistance of faculty members and/or students. For example, one committee member would ask two faculty members to help review trends in higher education based upon research results. These two faculty members reported their results at one of the faculty workshops. This approach resulted in many of the faculty becoming involved in the process right from the beginning.

The philosophical survey proved to be a very productive instrument to determine common beliefs among the faculty. If two faculty members didn't believe in a certain viewpoint on a topic it could be proven that 'X' number (in this case 18) faculty did support the viewpoint. It also identified topics they had differences about or did not understand.

The philosophical viewpoint was used to make decisions through the rest of the curriculum planning steps. The philosophy determined the subject matter to be studied (industrial technology), the majors (Industrial Arts and Industrial Science), a rationale for selecting major technical areas (the thematic approach), the technical areas (materials, transformation, energy, and communication), curriculum goals, just to name a few decisions.

The thematic approach as it was used in this curriculum project, refers to the selection of major themes of man's activities throughout the history of industrial technology. Man has transformed materials using energy and communications, hence these became the four major technical areas.

The philosophical viewpoint was used to generate a curriculum model and establish committees to define, structure, and organize subject matter and learning experiences in each thematic area.

In the completion of the six major steps used to plan the curriculum, the faculty invited and paid for a consultant to review the curriculum model. Through a grant awarded by the Board of Trustees of the Massachusetts State College System, four consultants conducted three day workshops in each of the four technical area, reviewing the work done in each. Also a fifth individual conducted a two day workshop reviewing the overall programs.

Two other major techniques used to plan the curriculum were having faculty members from other Departments join certain Committees because of their expertise and the use of a Steering Committee. The Steering Committee consisted of top administrators from the College and selected people from the Department. The purpose of the Committee was to review progress and discuss problems when they occurred.

The Industrial Technology Department Curriculum Project at Fitchburg State College has involved eight major steps, seven steps having been planned in detail before they were excuted. The eighth step will be completed in the near future. The rate and amount of change by the faculty determined the amount of change. We were very fortunate to have a faculty that saw the need to change and were willing to participate objectively, yet positively in the process.

ACIATE. TH-2:30-8

FUTURES WORKSHOP. Gary E. Lintereur, assistant professor, Department of Industry and Technology, Northern Illinois University, DeKalb, Illinois, Rex W. Pershing, associate professor, Department of Industrial Technology, University of Northern Iowa, Cedar Falls, Iowa, Lee H. Smalley, professor, School of Industry and Technology, University of Wisconsin-Stout, Menomonie, Wisconsin.

If the intent of educational goals has been to prepare students for the future, there appears to be a dichotomy regarding what students have received and what they should have received as needed content. It would seem that educators generally have been unduly influenced by the historian's statement, history tends to repeat itself, because of the nature of educational content. Unfortunately this oversimplification of the historical events does not reflect the many changes people have had to endure in a human society's development. Present educational content, which has been primarily based upon what has been recent information and events falls woefully short of preparing students for the future.

New information has always been forthcoming, but within recent decades, discrepancies in all disciplines, especially the sciences and technologies, have occurred at a much more rapid pace than could have been expected. What has been new information, has become common knowledge, and drifts into antiquity all within one short life span. This has been demonstrated by the fact that many employees may be retrained several times during a lifetime of employment.

Transportation and communication have caused considerable changes in our social and cultural behavior. No longer are we isolated by great distances and spans of time. What happened during the night are tomorrow morning's headlines.

The events of the future remain unknowable. What then can we do to prepare students for the future. There remains but one simple fact, change will be a part of the future. For people to function successfully in the future, they must learn to be adaptable and accept the challenge and uncertainty of the future. The responsibility of the futurist remains to find techniques and information that will develop flexible people who will adapt and solve problems that they will encounter in the future.

Although specifics about the future are basically unknowable, we do have methods of forecasting to help us either anticipate, prepare for, or decide what the future could or should be. Briefly let's look at a few of these methods. The first and simplest method of forecasting is called trend extrapolation. Historical data are plotted on a graph and then extrapolated into the future. This method is fairly accurate for the short term future as long as the trend maintains a constant rate of change as it did in the past. Some of the advantages of trend extrapolation are that data are readily available, easy to present and interpret, and identify when a barrier is approached which indicates that a new technology is needed if the trend is to be continued. A few disadvantages of trend extrapolation are that if a trend is misinterpreted it often leads to a "dooms-day" prediction, the graph is usually an over-simplified model of reality, and the "S" curve phenomenon of physical growth is unaccounted for.

Scenario writing is another method for identifying probable decision points and their related consequences in the future. Scenario writing often takes the form of a story about alternative futures (i.e., optimistic, unchanged, pessimistic) regarding a topic (i.e., population, food, materials, energy, family). Advantages of scenario writing include identifying trade-offs between alternatives and assessing the consequences of technological and social policies. Scenario writing does have limited use if a few of the important variables in the scenario change and it is difficult to integrate all the significant variables into a meaningful story.

The Delphi technique is another commonly used method for identifying participant opinion as to desirable/undesirable directions to pursue in the future by use of a reiterative systematic questionnaire process. Participants are usually identified by some criteria and subsequently sent three-to-five structured questionnaires over a period of time which are intended to elicit a degree of consensus among participant opinion regarding a statement about the future. The Delphi technique does avoid face-to-face confrontations where dominate personalities usually persuade less vocal individuals and it can involve a large number of individuals in the decision making process. Weaknesses of the Delphi are that the form of the question may influence the response and the consensus may become a self-fulfilling prophecy. The interested reader may want to read H. W. Lanford's Technological Forecasting Methodologies (1972) for other methods of forecasting the future. Now let's look at some activities that industrial educators can use to incorporate future studies in their classroom.

The heart of any educational program is the activities students engage in to develop the skills, attitudes and knowledge necessary to achieve the objectives of the course. What can students do that will contribute to their understanding and awareness of the future? The following will just be a laundry list to provide some ideas and examples:

-Design underground housing and other service buildings.
-Hook up meters to appliances to check energy use.
-Find new uses for recycling paper.
-Build equipment and monitor the particulate matter in the shop.
-Build models of alternative energy sources.
-Convert sawdust to a usable product.
-Select a present technical problem and present alternative solutions.
-Write a scenario on what a day in your life will be like in ten years.
-Develop a technological assessment of proposed projects in the community.
-Report on a reading assignment, "The Future of ...".
-Complete a "future wheel", by a small group, on something which impacts upon them.

Many additional ideas will come from the literature and talking with other interested people. The criteria for these activities are few: they must be future time oriented, they must relate to some personal or societal problems or possibilities and they must get started.

AIAA. T-10:45-6.

DESIGNING INDUSTRIAL ARTS/TECHNOLOGY FACILITIES FOR THE FUTURE, Myron Bender, associate professor and chairman, Department of Industrial Technology, University of North Dakota, Grand Forks, North Dakota.

It has been said that all education springs from some image of the future (Toffler, 1974). This is a vital concept since we educate for the future rather than the present or past. With this in mind, it is important to recognize the future as a crucial variable in all types of educational planning activities. Too often, the design of industrial arts/technology curriculum and physical facilities have been shaped by values of the present and past with only a casual look to the future. Consequently, this present and past planning perspective has caused early obsolescence.

Recent changes in curriculum, instructional methodology, educational technology, and student learning activities, in industrial arts/technology education at the college/university level have brought about new demands on physical facilities. It is the purpose of this presentation to identify evolving patterns and elements that need to be considered in the planning of physical facilities for the future.

Evolving Patterns

A review of the evolving patterns in designing industrial/arts technology physical facilities revealed three major trends: (1) A concern for adaptability and flexibility of instructional and ancillary space needs; (2) Increasing provisions for a variety of instructional methods and (3) Extensive use of instructional technology from overhead projectors to audio-tutorial units monitored through a centralized instructional resource center. (Castaldi, 1969).

The wide variety of curricular innovations in industrial/arts technology education in recent years has numerous implications for designing facilities. Current curriculum patterns indicate a trend towards classification of content into broad classifications such as communication, production, energy/power and transportation. Facilities should be designed to not only accommodate but also enhance the new curriculum. This can be accomplished by large-open laboratories that will reflect the clustorial content of the new curriculum. Open-type laboratories are also adaptable to a variety of learning activities with the greatest degree of flexibility. However, these must be supported by classrooms, seminar rooms, resource centers and study-carrel centers. Each of these must be equipped with sufficient and adequate instructional aids such as closed-circuit television, computer terminals, audio-tutorial learning centers, etc. The physical facility should possess adequate versatility and be compatible to a variety of instructional organizations and teaching methodologies.

Planning Sequence

Physical facilities to house industrial arts/technology educational programs at the college/university level should be built as a result of a rationale and ordered planning process. We need to start the planning process with the institutional purposes--traditionally and broadly stated as instruction, research, and service. The three broad institutional missions should be superimposed on the present and future missions of a department or program. These become the foundational framework for planning as to where a department is going or how to get there.

The Planning Cycle -- The actual planning for the design of physical facilities follows a predetermined cycle which can be divided into two phases. The first phase focuses attention on four basic dimensions:

1. Formulation of program goals and objectives.

2. Anticipation of program and nature of learning activities.
3. Estimation of the facility resources needed.
4. Preparation of preliminary specifications based on present and future needs.

Educational facility planning culminates in educational specifications. In the phase one of the planning cycle, a detailed set of program specifications must be prepared to yield information concerning students to be served, present and anticipated curriculum structure, nature of learning activities and educational technology to be utilized. This program description can be converted into an expression of required space needs after it is evaluated and adjusted to accommodate visualized changes in program, enrollments and teaching methodology. The anticipated or visualized changes are crucial factors to be considered to avoid early and costly obsolescence of physical structures. Past and present records of programs and enrollments provide a degree of guidance in futuristic planning efforts. However, planning must not limit it's parameter on the basis of past and present records alone. It is imperative that the design of facility include provisions for flexibility and adaptability to accommodate future changes that may not be recognizable at a given time.

The second phase of the planning cycle focuses on the processes involved in the plan development and implementation. Some of the basic steps are:

1. Justification of facility on the basis of demonstrable program needs.
2. Programs and curricula to be accommodated in the new facility.
3. Detailed listing of the amount of each type of space needs (laboratory, classroom, seminar rooms, resource center, etc.)
4. Basic design requirements and the functional relationships between various elements or space needs.
5. The site for the new physical facility in relationship to other related programs on campus and the basic guidelines for building configurations.
6. Utility requirements for each of the spatial units.
7. Fixed and moveable equipment requirements.
8. Preliminary cost estimates and timetable for construction.

Phase two in the planning cycle requires a great deal of negotiation between industrial arts/technology faculty, building committee, university administration and the architect. Any adjustments in the initial plan should be made by the user (industrial arts/technology faculty) within the realm of external limitations. When reductions or changes are required, it should be the faculty or user who establishes priorities and identifies those spaces which can be eliminated, changed, and/or reduced that will have the least effect on the specified program.

Summary

If an educational facility is to truly enhance the teaching/learning process, they must be designed to maximize educational opportunities. Facilities for industrial/arts technology education at the college/university level should be capable of serving a variety of functions and be readily adaptable to changes. Consequently, the design should allow for the greatest degree of flexibility and must favor educational innovations in curriculum, methodology and educational technology.

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1. Castaldi, Basil. Creative Planning of Educational Facilities. Chicago: Rand McNally and Company, 1969.
2. Learning for Tomorrow: The Role of the Future in Education. (Edited by Alvin Toffler), New York: Vintage Books, 1974.

AIAA. T-9:00-2.

PERSPECTIVES ON THE FUTURE: INDUSTRIAL ARTS PLAYS A KEY ROLE IN FUTURE EDUCATION. Donald Maley, Professor and Chairman, Department of Industrial Education, University of Maryland, College Park, Maryland.

A new dawn is breaking the morning hours of education as it prepares to enter into the decades ahead. It is a new day in many and different ways from the education that man has experienced up to this time. It is an educational day that has no precedents, no models to follow, and no traditions in which to anchor as were common in the past. All periods of history have had their futures, most of which could be predicted because of the slowness of change from one period to the next. The present society involved in a rapidly changing world does not have the luxury of forecasting on hindsight. The society of today and its chief instrument for change -- education -- must seek out and employ those means by which the human may build and prosper in an indefinable future, the likes of which man has never experienced.

But how does Industrial Arts enter into a meaningful partnership in an educational enterprise that must focus on the needs of a fast-changing world, where the old answers do not fit the new demands of society? There are two ways by which Industrial Arts can enter into the picture. The first is to be aware of the educational needs of the future as expressed by recognized leaders in the broad futuristic movement as it affects education, and then identify with those needs wherein Industrial Arts can make a significant contribution. The second way in which Industrial Arts can enter into a meaningful relationship with futuristic education is to shed itself of much of the trappings of the past and invent its own role based upon reality, sound educational practice, the needs of people in the future society, and the uniqueness of potential that Industrial Arts can contribute. This latter one may prove to be the most difficult because of the obvious re-tooling job that will need to be done. However, such a re-tooling job has happened in much of the world about us with little or no impact on the Industrial Arts profession or education in general. It is likely that a combination of the two procedures would be most desirable. The perspectives of the leaders in futuristic education would then become the conceptual base or the platform on which the Industrial Arts profession would invent or create its role in the educational framework of the future. However, if the Industrial Arts profession chooses to not agressively move out with a new and dynamic role in a society that is placing greater emphasis on understanding technology in its educational system, we may have that decision made by others, who do

not quite understand the potential or significance of this area.

Three important concerns grow out of this need to "invent the future" for Industrial Arts. (1) That one way or another or in one form or another, there may be an Industrial Arts in the future just as there has been in the past. (2) That Industrial Arts may move into the future caught up in the tide of events without any real direction, respected position, or particular relevance. (3) That it is in the profession's power and capability to decide what it wants and to create its own role in an educational system that gives increasing emphasis to the study of technology. Essentially, what this all means is that the Industrial Arts profession must begin to make important decisions of policy, purpose, and direction so that its role is defined clearly and precisely as we move into the Twenty-first Century.

One starting point in the process of inventing the future for Industrial Arts is to set forth a series of guidelines that may assist in establishing focus as well as direction to that invention of its future. The following are a few suggestions of guidelines to follow. (1) The program should focus on technological alternatives in dealing with identifiable problems of mankind. (2) The program should provide insights into the more effective use of leisure time. (3) The program should provide for extensive and effective involvement in community and societal problems. (4) The program should make extensive use of community resources. (5) The substance of the program should promote the development of innovation, problem solving, and speculation. (6) The program should be based upon a living-learning involvement with the current and future issues facing mankind. (7) The program should be directed towards the total population and at all levels in education. (8) The program should be directed towards the wise use of technology as well as understanding it. (9) The program should be multi-disciplinary in its approach to problems and issues. (10) The program should place considerable stress on the development of the learning processes. (11) The program should be rooted in the human needs of a dynamic, fast-changing society. (12) The program activities, content, and processes should be based on the learning and developmental growth needs of the individuals served.

It is apparent that certain guidelines would be present regardless of the nature of the future. At the same time, it is obvious that the changing nature of the future will create special problems and needed guideposts for the future.

AIAA. W-3:45-7

HOW TO BECOME A FUTURIST. Gary E. Lintereur, assistant professor, Department of Industry and Technology, Northern Illinois University, DeKalb, Illinois, Lee H. Smalley, professor, School of Industry and Technology, University of Wisconsin-Stout, Menomonie, Wisconsin.

One might think that being a futurist in a "past" orientated society might be a frustrating existence. After all, how many courses are taught in our public schools and universities with the term "future" in it versus the number of courses taught with the term "history" in it? How many times do you hear someone say that "if I would have known then what I know now" versus "let's see if we can't anticipate some of the consequences of our actions so we are not sorry in the future about the decisions we make today?" Or "history is important because it helps us understand the past" versus "history is important because it helps us understand our future?" More rhetorical questions could be proffered but the point we are trying to make is that yes-being a futurist in a "past" orientated society is sometimes frustrating-but it doesn't have to be. Why not? Because we are all futurists-we only vary in our degree of involvement. Most of us have thought about tomorrow, many of us have thought about next week and next month, a large number of us have thought about next year and a "futurist" thinks about the near term, long term, and far term future.

When it comes right down to the basics, being a futurist is only a state of mind-an attitude about existence if you will-a way of looking at events and conditions in the past and present-but extending every event or condition into the future and anticipating its consequences. Therefore, the first step in becoming a futurist is developing a mental process by which you ask yourself (and others) the following questions. If what happened in the past (good old days-which I questions how good they were) was desirable, how can we replicate that situation in the future (the history repeats itself concept)? Having identified a contemporary "fact" about society/science/technology/whatever--so-what? What does that mean for society/me in the future? Five years from now? Ten years from now? X or Y happened in the past and the trend continues today. Should we continue it in the future? To what extent? What are the consequences if we enhance or inhibit the trend? What are the first order consequences? Second order consequences? In other words, whatever you discuss about the past or present, take the discussion one step beyond into a future time frame. The present is merely a fleeting point on a continuum that connects the past with the future. The present becomes the past and the future becomes the present and on the cycle goes (we hope-or we are all in trouble!).

As industrial arts educators, the authors both teach graduate courses on the history of industrial arts. Basically those courses deal with looking at industrial arts in the past to better help our students understand the future alternatives for industrial arts. (The authors also teach graduate courses dealing mainly with the present and future of industrial arts.) The authors might add that teaching students about the future might put the instructor in a somewhat uncomfortable position at first because basically the future is unknowable. There are no RIGHT answers to the questions about the future, like how long did the hundred years war last? The student's opinion may differ from the teacher's, but to say that the teacher

is right because of seniority may be incorrect because the students of today will be shaping the world of tomorrow. The point is that the past can not be changed-it is relatively fixed-but the future is determined by decisions we and our students will make today and tomorrow.

Once a person develops the mental state for becoming a futurist, it is helpful, if not imperative, to become an "expert" in the field. To become an "expert futurist" in the field means that you must know something, or be able to do something, that is beyond the abilities of the general public. Following is a list of resources that will give you this edge in the area of future studies.

You must join the World Future Society, 4916 St. Elmo Ave., (Bethesda) Washington, D.C. 20014. The dues are $15 per year for regular membership, which includes the magazine Futurist and entry to an assortment of books, tapes, films, organizations, conferences, and most importantly, contact with others who have similar interests as yours. Other organizations you may wish to correspond with are:

-Center for Futuristic Studies, International Graduate School of Education, University Park Place, Parker, CO 80134
-The Futures Group, 124 Hebron Ave., Glastonbury, CT 06033
-Institute for the Future, 2725 Sand Hill Road, Menlo Park, CA
-Resources for the Future, 1755 Massachusetts Ave., N.E. Washington, D.C. 20036

Magazines, with their short lead time, provide an early warning system for futurists. There are numerous magazines and newsletters published and some of the most common are:

-Futures-A journal of forecasting and planning, IPC America, Inc. 205 East 42nd St., New York, NY 10017.
-Technology Review-Room E-10-430, Massachusetts Institute of Technology, Cambridge, MA 02139, $15 per year.
-What's Next-Congressional Clearinghouse on the Future, 3962 House Annex #2, Washington, D.C. 20515 (free).
-Futurics-The Science Museum of Minnesota, 30 E. 10th St., St. Paul, MN 55101, $12 per year.

Books related to the future are numerous so only a small variety that will lead you to others are included here:

-Cornish, Edward and Others, The Study of the Future, Washington, D.C. World Future Society, 1977, 307 pp., $9.50.
-Kauffman, Draper, Teaching the Future, ETC Pub., Palm Springs, CA.
-Lauda, D. P., & L. H. Smalley, The Future: A Challenge to Industrial Arts, American Industrial Arts Association, Washington, D.C. Monograph 5, 1975. $2.
-Smalley, L. H. (ed.), Future Alternatives for Industrial Arts, 25th Yearbook of the American Council on Industrial Arts Teacher Education, 1976. Available through McKnight Pub. Co., Bloomington, IL

From these organizations, magazines and books you may develop your own expertise and begin to make your contribution; through teaching, research projects, writing, speaking, and encouragement to others that the only way to go, is via The Future.

AIAA. TU-9:00-3.
LEARNING FOR TOMORROW: YOUTH'S GATEWAY TO THE FUTURE.
Kendall N. Starkweather, assistant professor, Department of Industrial Education, University of Maryland, College Park, Maryland.

To consider technology, education or any facet of society, one must consider the population who make the decisions controlling each individual's destiny. Much consideration has been given to past trends and future demographic projections for the United States. Our nation is now experiencing a decline in the annual number of births. A decline which started in 1970. Assuming that net immigration will continue at the present rate of 400,000 per year and that there will be no significant change in life expectancy, the total population will reach somewhere between 260-265 million by the year 2000. This is an increase of 50 million people as compared to the population in 1975.

When we address the "population issue" we are addressing endless other issues for there are really very few facets of American life that could not be directly tied to demography. Population questions are interwoven with questions concerning quality of life, the environment, energy, transportation, communications, and the control of life with regard to reproduction. These population questions could also be considered as technological questions for values change as the different generations of society members contribute to everyday happenings. As educators aware of these coming demographic changes, we must prepare an increasing number of individuals for productive lives in this nation.

In a recent Harris poll of the American public, significant changes in American attitudes were found. Those polled indicated: that they want to participate in community decisions affecting their lives; that they prefer to cooperate, rather than compete, with others; that they want to experience life directly rather than watching it on TV; that they welcome challenges to their creative abilities; that they think modern technology has caused as many problems as benefits to people; that they would prefer a clean environment to one which provides many jobs; that the country would be better off if children were educated more to find their own inner satisfaction than to be a success and make a lot of money; that economic growth falsely makes people want to acquire more possessions than to enjoy non-material experiences; that it is more important to teach people to live with basic essentials than to reach higher standards of living; that they prefer spending time getting to know each other as human beings, rather than speeding up our ability to communicate through technology; that it is more important to learn to appreciate human values--as opposed to material values--than it is to find ways to create more jobs for producing more goods; that they want more emphasis on breaking up big things and getting back to more humanized living than to develop bigger and more efficient ways of doing things.

As we relate this knowledge to the discipline of

education, we must realize that education is more than schooling. One of the main objectives of education has to be a strong commitment to learning. Schools basically separate the winners from the losers for if a kid does not survive with education, he/she will not likely become a doctor, lawyer, etc. We know that in the future, there will be children, they will need schools, and schools must fit the environment. A look at educational issues as related to social trends indicates that we might consider the following in future educational practices. Greater citizen involvement in public decision-making; emergence of 'social drawing rights'; lifestyles which reflect a shift in values from materialism to personal fulfillment; incorporation of out-of-school learning; interdependency of society and need for controls which protect the interests of society; mounting tension and even violent conflict between groups; threatening problems of the ecosystem; greater complexity of policy issues relating to technology; increasing serial careers; diversity in family structures.

Now that we have taken a look at the number of individuals who will exist in our society, attitudes and values of people, considerations of technology, and the nature of education, let's take a look at the role that industrial arts is taking in the educational process of young people. The emphasis in the typical program will most likely be on the construction of the project, NOT on the needs and development of the student. Industrial arts programs can and have interpreted technology while being reflective of society; providing opportunity for students to learn to be life-long learners; allowing students to seek and react to challenge; applying usable knowledge; providing the desire to excel; improving current practices; instilling initiative; providing leadership, allowing for manipulative activities;providing training in research; and being a part of an intergrative educational approach.

There is no reason why industrial arts should not be in the forefront of your educational system. We have the blend of content accessible to us. For example, we have the capabilities to study such technological problems as alternative energy systems; appropriate technologies for our society; ecology, pollution, and the environment; housing requirements; economics and consumerism; value systems as related to technology; transportation and communication problems; combining disciplines such as architecture and resource utilization; studies of high volume industries; and research and experi mentation techniques.

The youth in our society must be educated toward an awareness of technology as it develops on the international level. Industrial arts can play an important part in improving the technological literacy of man. However, if industrial arts is to play an important role in learning for tomorrow, industrial arts teachers must observe the habits, attitudes, and values of people, consider technology as it is today and will be in the years to come, and design learning activities which are in tune with the society in which the youngster is going to live.

GRAPHIC COMMUNICATIONS

AIAA. TH-2:30-3:30

AIRBRUSH RENDERING. Wandel L. Dye, Assistant Professor, Department of Industrial Education and Technology, Western Kentucky University, Bowling Green, Kentucky.

Airbrush rendering is used in practically every field of present-day art. It is also used as a tool for the purpose of applying paints, stains, lacquers and other finishing materials in industry. One of the more recent uses of the airbrush is decorating vans, motorcycles, etc. Two of the greater demands for airbrush rendering, however, are within the area of advertising and photo retouching. Surveys show that many of the illustrations and photographs used in magazines, newspapers, catalogs, and brochures have been rendered or retouched with the airbrush to give them that finished look.

Achieving good results in airbrush rendering is not accomplished only by those who have inherent artistic ability as many would think. However, the artistic ability is required in self-expression and creative visualization. Good airbrush rendering can be largely summed up in one word -- CONTROL. The word "control" is made up primarily of two words--knowledge and skill. If one can sketch or draw with a pencil, one can learn to airbrush. Just as drawing with the pencil, airbrush, too, requires consistent practice.

The quality of work and pleasure received from using the airbrush will depend somewhat on the correct choice of airbrush. All airbrushes are of the single or double action type. There are many styles and brand names on the market today; however, the type and size of work to be done along with the type of material to be used in the airbrush will largely govern the selection of type and style airbrush needed to perform the work.

Major companies that manufacture the airbrush are: Wold Airbrush Company, Paasche Airbrush Company, Thayer & Chandler Airbrush Company, Badger Airbrush Company, and Binks Manufacturing Company. There are other brand names that have come onto the commercial market in recent years, but they are not the older and more established airbrush manufacturers. Other pieces of basic equipment required for airbrush rendering are: air supply (compressor or carbon tank), air regulator, moisture trap, table, and a good drafting table lamp.

Before practice begins with the airbrush, there are basic materials that will be needed. Black airbrush ink (water color) is one material that should be kept on hand at all times. It is the better medium for practice; and, it can also be used for professional applications. A long list of other materials could be made, but materials such as a drafting set and other drafting supplies, finished paper, white opaque paper, airbrush colors, clear acetate, frisket knives, rubber cement pick-up, and drawing pencils should make up a good list for the beginning airbrush student.

Control of the airbrush should be the primary objective of the beginning student. Control will only evolve through

much practice, and practice will only evolve through much patience. Therefore, with lack of either patience or practice, the beginner should not be surprised if control of the airbrush never evolves. One of the greater pitfalls in learning to airbrush is the temptation to play and dabble with the airbrush. Many exciting designs can be made by the airbrush through blowing color onto the paper in a haphazard fashion; however, this does not allow one to learn to airbrush with control.

Basic exercises are for the purpose of learning control. Mastery of the airbrush may be gained by carefully and patiently practicing the basic exercises first before attempting to render any type of form with light, shade and shadow. The dot exercise is a good beginning exercise. Here, the beginner learns to control the amount of color that comes from the airbrush and the correct distance the airbrush should be held from the surface for desired intensity and effect. Patterns for dot exercises may be drawn up by drawing a series of vertical and horizontal lines 3/4 inch apart on regular plain white paper. The objective in the dot exercise is to airbrush a full page of dots, the same size and intensity, at each intersection of the lines. A full page of small, medium and large dots should be satisfactorily airbrushed before the exercises are considered complete.

There are other good exercises for learning control, but the two that allow the beginner to practice the art of airbrush rendering are the flat and graduated washes. To achieve these, an approximate 6"x6" square is cut from a piece of 10"x10" clear acetate. After rubber cementing the 10"x 10" template onto a sheet of good white opaque paper, the flat wash should be airbrushed, then the graded wash (black to white). Both washes should be practiced until one of each has been completely rendered without the presence of color patterns, light or dark areas within the total portion of the washes. It must be remembered by the beginner that proficiency is gained only through practice.

After, and only after, all of the exercises have been satisfactorally completed, the student of airbrush should be ready to move into the study of light, shade and shadow as they relate to basic forms. There are five basic forms that can be studied in conjunction with light, shade and shadow. These forms collectively make up all existing surfaces. Namely, the forms are the sphere, cube, cone, cylinder, and the concave. Templates for each form may be cut from clear acetate and rubber cemented to white opaque paper for rendering purposes. A good book containing value study in relation with these basic forms should be secured as reference material. Successful rendering of these basic forms will provide a foundation for successful airbrush rendering on a professional level.

FOOTNOTES

Dye, Wandel L., Airbrush Rendering and Techniques. (unpublished book) Industrial Education Department, Western Kentucky University, Bowling Green, Kentucky; 1978.

AIAA. W-3:45-2

GRAPHIC COMMUNICATION, Claude A. Bell, associate professor, Department of Industrial Technology, Illinois State University, Normal, Illinois.

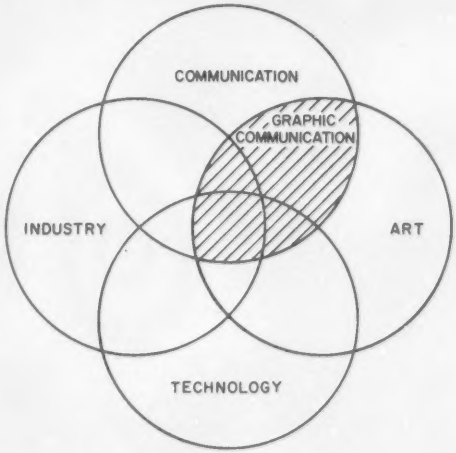
Graphic Communication, in the Department of Industrial Technology at Illinois State University, includes selected activities from the total graphic communication field, but it includes more than graphic arts. It is necessary to "set the stage" to give a better understanding of Graphic Communication as it applies to our program.

Illinois State University, the first state supported school for higher education in Illinois, was established in 1857 and was among the first normal schools to introduce handwork courses into the school program, under the descriptive term of manual training. Handwork was first offered under the direction of William T. Bawden. Mr. Bawden had received his preparation in Teachers College, Columbia University, and had taught in Buffalo, New York.

As the program grew and new courses were added, student requirements for a degree and for certification in industrial arts were increased. A new building in 1964, student pressure for more freedom in selection of courses, new staff members with differing philosophical education and the reduction in the number of hours required for graduation forced a staff study of required courses for the degree in industrial technology.

It was apparent that changes must be made in course requirements to reflect the philosophy of the Department. A plan was conceived to design new courses to introduce students to course offerings of the Department. Computer graphics, drafting, graphic arts and photography were to offer a course in graphic communication; ceramics, metalworking, plastics, textiles and woodworking were to offer a course in materials and processes; automotives, electricity, electronics and fluid power were to offer a course in power and energy; and traffic education and occupational safety were to offer a course in accident prevention.

Wayne Lockwood, computer graphics; Claude Bell and Roger Herberts, drafting; Dean Blomgren, Fred Kagy, Joe Metcalf and Don Ruby, graphic arts and photography; and Joe Talkington, Chairman of the Department studied the broad area of graphic communication. The figure to the right is a philosophical indication of course content selection. Limitations were placed by philosophical considerations, staff, facilities and University politics.



Graphic Communication was offered as an experimental course in the Fall of 1970-1 with two instructors and twenty-four students meeting six hours per week in a lecture-lab setting. The Spring semester of 1971-2 the course had grown to four sections and we experimented with a lecture group of 48 students. The larger lecture proved successful and by the

Spring semester of 1972-3 we had settled on one large lecture meeting two hours per week and each lab section meeting four hours per week. The present semester we have 147 students in the lecture with six lab sections.

The course has always been a team teaching situation. A mixture of permanent staff, temporary staff, faculty assistants, graduate assistants, and/or undergraduate teaching assistants are assigned to the team.

Graphic Communication is designed to have the students learn about selected elements of graphic communication. Time will not allow skill development, but an attempt is made to give the students an indication of skill and time necessary to produce graphic communication.

Each of the first three laboratory activities is alloted four hours of lab time. The activities: sketching-isometric and orthographic, layouts - two advertisements, and PLOTPAC - a computer graphics assignment that requires a circle, a rectangle, a series of two or more connected straight lines and some written information. These activities are conducted in a large classroom with tablet arm-chairs by two instructors with 45 to 55 students.

The next three weeks the sections of 22 to 28 students are taught in the graphic arts or drafting lab by one instructor. In the drafting lab the students work with isometric and orthographic drafting, lettering, inking, and reprographics, while the students in the graphic arts lab obtain instruction in paste-up, plate making, press work, screen printing, and continuous tone photography. The next three weeks the students change labs and instructors so that all receive the same instruction.

In addition to the lab assignments students are requested to abstract reading assignments and to write and illustrate a technical report as assigned. These two assignments and all lab assignments are individual assignments.

Two sections are together again in the large classroom for three weeks to complete individual assignments of a poster, a graph and GRAPHPAC - another computer graphics assignment. The remainder of the semester is used for group projects. Students are divided into groups of five or six students and each is given a graphic communication problem that the group must solve and present as an illustrated oral report and as a written illustrated technical report.

A basic reason for Graphic Communication is the following statement from an unknown author, "I KNOW YOU BELIEVE YOU UNDERSTAND WHAT YOU THINK I SAID, BUT I AM NOT SURE YOU REALIZE THAT WHAT YOU HEARD IS NOT WHAT I MEANT"!

PICA Graphic Communication Education Program, J. Page Crouch, Professor, Department of Industrial Education, Clemson University, Clemson, S.C.

What is the PICA Graphic Communications Education Program? It is a comprehensive curriculum describing the graphic arts industry and its careers. It's a teaching tool that provides students with hands on experiences in this broad and exciting industry. Furthermore, it's an individualized method of instruction that allows students to work at their own rate, creating products that give personal satisfaction and a sense of accomplishment.

Both the exploratory and advanced programs are organized in comprehensive curriculum guides and implemented through the use of SIPs and LAPs. SIPs are Self-Instructional Programs in a sound-slide form. Through the use of SIPs, the students may begin new areas of study at any time; they are not held back by their classmates or the teacher. LAPs are Learning Activity Packages. LAPs are step-by-step illustrated instructions that the student follows while working through a task. A Lap is like a tutor. This new graphic communications education program is designed to be flexible. Teaching must be recognized as an art as well as a science. Teachers can easily adapt the program to fit the needs of their own classrooms and methods.

Favorably evaluated by the prestigious team that conducted the nationwide Kodak Graphic Arts Industry Manpower Study, and field tested by the Communications Media Occupations Career Cluster Project of the U.S. Office of Education, the program is already in use in more than 700 jr. and sr. high schools, vocational centers and colleges throughout the country. It's also being used in numerous correctional institutions for inmate rehabilitation. Industrial in-plant training programs are employing appropriate parts in their personnel development efforts.

Development of the program continues. The unique PICA-Clemson-S.C. Dept. of Ed. marketing arrangement channels monies from the sale of the program directly back into the project at Clemson University. A staff of graduate students, curriculum and media specialists are continually supplementing, refining and updating the program to keep pace with changes in the graphic communications industry and with the needs of educators.

In 1974 when the curriculum was first released it was composed of 40 SIPs, 30 LAPs and a 400-page guide. Today there are two guides. "Exploring Graphic Communications" is for the industrial arts class and calls for only twenty-one SIPs and LAPs. It covers the basics of offset, letterpress, screen printing and photography. Students are enticed to learn via "fun" projects like T-shirt printing, making printed booster buttons and ribbons, letterheads, picture calendars and more. The Advanced program is organized in an 1100 plus page guide contained in two volumes. It employes 58 SIPs and 44 LAPs. Thirty "project assignment sheets" (PASs) direct the student through all the needed steps and instructional programs to produce jobs ranging from basic single color tasks to advanced endeavors including four color process printing.

Each Project Assignment is identified by a number and an alphabetic code to indicate the difficulty or level of the project. An "A" code indicates a project that may be tried by anyone without any previous experience. It is suggested that before a "B" level job is tried the learner should have already completed at least two or three

simple jobs. Project assignments with a "C" code should only be undertaken by students who have demonstrated their ability to learn by prior success with many simpler projects.

The PAS answers for each student, the question: "What do I do next?" This goes one more step toward freeing the teacher to concentrate on motivation and questions requiring close personal attention.

The Graphic Communications Education Program with its SIPs and LAPs enables individual learners to experience exactly what they are in need of at a particular time. When a student needs help or materials the teacher is free to provide this assistance rather than being tied up demonstrating to one half or a third of the class for long periods of time.

This approach is better for the students. They go to the SIP for the instruction that they have always had to wait for in the past. The instruction is always ready when the student is. Students are less likely to become bored and turn free time into disruptive behavior.

All students receive the same instruction in a well-organized manner, not subject to the interruptions or the poor visibility characteristic of so many traditional demonstrations. The student can hear every word without interference.

The guide also contains all the necessary overhead transparency originals, clip art, sample layouts, equipment and supply lists. Of course pre-tests, achievement and performance tests are included for each of the behavioral objectives.

Special Institutes are conducted each summer at Clemson for graphic arts teachers desiring advanced technical instruction and first hand experience with this teaching methodology. A full time (40 hours/wk.) CETA program runs in the Clemson lab training the unemployed for careers in graphic arts. A special individualized training program for employees in the graphic arts industry is also run at Clemson to further demonstrate the great potential of individualized instruction. This program is not available anywhere else and it pays its own way plus subsidizing the ongoing graphic arts program in the industrial education department at Clemson.

AIAA. Th 3:45--5.
CALLIGRAPHY IN GRAPHIC COMMUNICATIONS. Robert G. Hostetter, associate professor, Millersville State College, Millersville, Pennsylvania.

People are fascinated by the appearance of fine handwriting or calligraphy. This fact bears some significance to those who teach graphic communications in the industrial arts departments in our schools. The study of calligraphy can add much to the graphic areas of the program. There are many facets of culture associated with the development of the 26 letters as they were used through the ages. Cutting a chisel edge pen from a reed will give students an acquaintance with writing as it was done by the Egyptians. Fashioning a writing tool from a goose wing feather will give a first-hand appreciation for what the scribes of the Middle Ages accomplished in producing the beautiful books of the period. It is interesting to note that the first type specimen sheets were made up of the letter styles that were written in manuscripts of the years preceding the invention of moveable type. The aspects of culture associated with an intensive study of writing with all its implications make up a body of knowledge that is as rich as any of the areas of the liberal arts.

It will be found if students are given the opportunity to practice hand lettering that there will be some who have the aptitude to do creditable work that will be suitable for copy to be photographed and run on the offset press. Experience in hand lettering provides a first-hand acquaintance with letter spacing, style and layout. Flexibility is unlimited and a full range of creative design can be achieved which is not possible when using the standard type and transfer letter systems.

In order to present a unit of work in calligraphy the usual drafting room facilities with a supply of chisel edged pens and pencils will be all that is needed.

Starting with the basic letter forms the student can progress at his own rate and move to more advanced styles and apply the skill acquired in layouts for name cards, book plates and posters that may be printed in one or more colors by the offset process. There are many good sources from which a teacher can study basic hand lettered alphabets and prepare materials for students to use in getting started.

The instructor will soon notice the look of satisfaction on the faces of the students who have experienced the joy of creating an individual design. This satisfaction is one that is much needed in our mode of living and is an area that we in industrial arts education have a distinct opportunity to supply.

Since the term Graphic Communications implies a much wider range of study than is usually found in our school print shops and as the Handwriters Guild of Toronto suggests that hand written forms are a vital force in today's civilization it would seem that this area of work would braoden the activities to justify the use of the term

Graphic Communications. In a sense our interest in hand written forms have been reborn with the use of present day repro-techniques.

In the past five years there have been societies formed that have conducted classes, held exhibitions and published much that would prove helpful to one teaching calligraphy. Several are listed below.

Society of Scribes
Box 933
New York, NY 10022

Handwriters Guild of Toronto
60 Logandale Road
Willowdale M2N4H4
Ontario, Canada

Philadelphia Calligraphers' Society
1807 Danforth Street
Philadelphia, PA 19152

Calligraphers' Guild of Washington, D.C.
Dick Jackson, pres.
3105 Northwood Road
Fairfax, VA 22030

SOURCES FOR BOOKS AND SUPPLIES

Calligrafree, Box 96, Brookville, OH 45309
Dick Blick, PO Box 1267, Galesboro, IL 61401
Hunt Mfg. Co., 1405 Locust St., Philadelphia, PA 19102
Pentalic Corp., 132 W. 22nd St., New York, NY 10011
Local art supply stores carry books and supplies for lettering.

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Anderson, Donald M..The Art of Written Forms. Holt,Rinehart and Winston, New York. 1969. A comprehensive volume giving both the history and practical aspects of letter forms and writing systems.

Biegeleisen, J.I. Design and Print Your Own Posters. Watson-Guptill Pub., New York, 1976. Poster design with good material on silk screening.

Child, Heather..Calligraphy Today. Pentalic Corp., New York, 1976. A treatise on contemporary usage of hand lettering with many examples shown.

Douglas, Ralph. Calligraphy with Broad Pen and Brush. Watson-Guptill Pub., New York, 1972. A hand lettered basic text containing specific techniques and examples.

Johnston, Edward. Writing, Illuminating and Lettering. May be ordered from Pentalic Corp. First published by Johnston in 1906 and thought by many to be the finest ever written.

Ogg, Oscar. The 26 Letters. Thomas Y. Crowell Co., New York, 1948. A very well illustrated book on the development and usage of the twenty-six letters.

Stoner and Frankenfield. Speedball Textbook, 20th ed. Hunt Mfg. Co., Philadelphia, PA. 1972 An instruction manual with suggested techniques and styles with some good examples of calligraphic works.

AIAA. W-3:45-2

GRAPHIC COMMUNICATION TECHNIQUES: CURRICULUM, ACTIVITIES AND REQUISITIONS. H. Terry Leeper, instructor, Department of Occupational Education - Industrial Arts Program, North Carolina State University, Raleigh, North Carolina.

The graphic arts educator is often confronted with such problems as time consuming paper work, increasing student enrollment, rising costs for laboratory supplies, limited laboratory space and requests by administrators to utilize a performance based instructional system. While each of these problems cannot be easily solved, they can be made manageable through curriculum development. In developing a performance based curriculum consideration should be given to the identification of terminal objectives, selection of student activities and establishing criteria for evaluation.

Terminal objectives describe what the student will be able to do upon completion of the course. A terminal objective for a unit in screen process printing would read: screen print 20 copies from a presensitized stencil with a maximum image area of 8 X 8 inches. The assignment must include one of the following options listed below:

OPTION ONE: Three color photo posterization.
OPTION TWO: Three colors with two photo generated images and one mechanical image.
OPTION THREE: Three colors with one photo generated image and two mechanical images.

In stating the objective a number of assumptions have been made and certain parameters have been specified for the assignment. It is assumed the student will process posterization separations, will generate presensitized screen stencils and will print them in close registration. These assumptions are commonly called enabeling objectives. The enabling objectives are a sequence of activities which "enables" the student to complete the terminal objective. When writing the curriculum remember that one must identify terminal objectives rather than enabling objectives.

The parameters written into the sample objective above includes printing 20 copies with a maximum image area of 8 X 8 inches and the selection of one of the three options. These parameters tell the student what is expected, but does not limit his ability to design and print an original product. In addition the parameters eliminate waste or abuse of expensive graphic arts supplies.

An effective method for developing the curriculum guide is to consider each of the major printing methods and write objectives for each. The finalized listing of objectives becomes the curriculum guide. Once the curriculum guide has been developed, instructional activities can be organized to enable the students to achieve the terminal objective. Instructional activities include reading assignments, lectures, demonstrations or mediated instructional packages.

The final element of the curriculum is to specify the criteria for evaluation. How is the student to be evaluated? The evaluation segment should be carefully planned and shared with the student. In a performance based system either the student has achieved the objective or he has not. If there are ten performance objectives for the course, achievement of all ten would be an A, nine a B and so on. Do not try to grade each laboratory activity as A,B,C,D or F. Have the student prepare a comprehensive layout for each assignment. After the layout has been approved by the instructor the student can proceed with the printing process. If the printed product corresponds to the comprehensive layout then the student has achieved the terminal objective.

Industrial printing plants follow similar procedures.

The curriculum in terms of specified terminal performances, activities and evaluation procedures can be duplicated and shared with students. One might prepare information sheets on laboratory operation techniques which includes units on safety, clean-up activities and responsibilities. Another packet of information might include a section on laboratory orientation explaining class meetings, required supplies, the organization of assignments and final grade determination. Such a curriculum becomes the student's contract for the course.

In addition to helping the student, the curriculum benefits the instructor as well. No longer does laboratory activities have to be graded subjectively. Laboratory assignments either meet the criteria outlined by the objective or they do not. Limiting the size of printed products and/or type of materials used, helps conserve on expensive graphic arts supplies. Also, the instructor will be able to determine what types of materials need to be ordered and in what quantities.

The organization of the performance based curriculum allows the classroom teacher to divide the class into groups. Establish one group for each of the major printing processes. The groups can be rotated every week or two until all students have been exposed to each of the areas. The rotation of students from one area to another provides for maximum use of facilities. Maximum utilization of facilities is a must with increasing enrollment especially when space is at a premium.

A performance based curriculum as described above has been utilized for the graphic arts courses at North Carolina State University for the past two years. The system has been widely accepted by faculty and students alike. Students particularly like knowing what is expected in the course and appreciate having a curriculum guide specifying the requirements for each assignment. Each semester the class is divided into four groupings and students begin working on the various assignments. The grouping allows students to interact with each other and to share ideas.

One objective which students enjoy most is the preparation of a portfolio which contains a copy of each printed assignment along with the respective comprehensive layout. Industrial arts majors are required to prepare lesson plans and supplementary information sheets to accompany each of the projects illustrated in the portfolio. Non-majors are required to prepare information sheets discussing how each of the printing processes correlates to their major field of studies. The portfolio has been effective in helping students secure employment.

Curriculum development affects so many aspects of instruction. An effective system will eliminate unnecessary paper work, will help conserve on costly supplies and will ease the problem of an over crowded classroom. Curriculum development involves careful consideration for the organization of the course, but will be helpful to both the instructor and student.

INDIVIDUALIZED INSTRUCTION

AIAA. W-7:00-8:30.

LET'S MAKE AN I.M. Michael R. Kozak, assistant professor, Department of Industrial Education and Technology, Montclair State College, Upper Montclair, New Jersey.

Industrial arts laboratories are a part of general education, and as such, should reflect contemporary curriculum practices. A demonstration is given to a class of twenty-five students on "Thread Cutting on the Lathe". Some students will try it today, some tomorrow, and some may not have a chance until next week. By then, they may not remember the proper procedure to follow. Instructional modules can help solve this problem.

An instructional module may be defined as: "a structured sequence of learning events designed to accommodate the attainment, on the part of the learner, of a wide range of behavioral objectives (Kozak, 1974, p. 136). Some instructional modules, such as the Learning Activity Package, are well known, while others, such as the Booklet for Individualized Progress, are not as well publicized.

An industrial arts program that correctly utilizes instructional modules will permit a student to begin at a level at which he is currently functioning and will allow him to move forward at his own pace. Instructional modules can be utilized in four ways: 1) the instructor determines both the objectives and the learning activities; 2) the instructor determines the objectives but the student selects the learning activities; 3) the student selects the objectives he will pursue and the instructor determines the learning activities; and 4) the student determines both the objectives to be learned as well as the learning activities to reach those objectives.

The student must be led - step by step - through an instructional module. He should never have to ask: "What shall I do next?" Before beginning to incorporate instructional modules into an existing program, certain questions must be answered:

1. Who will determine what objectives each student will pursue?
2. Will all objectives be reached by all students?
3. Who will score the various examinations?
4. What will be the criteria for mastery?
5. Who will determine the learning activities to be used?
6. How will the program provide for individual differences?
7. What type of pacing will be employed?
8. How will grades be determined?
9. What is the role of the instructor?
10. Will additional personnel be needed?
11. Will additional equipment and supplies be needed?
12. What, if any, will be the additional cost of the program?

A comparison of fifteen instructional modules resulted in a listing of nine headings, in addition to the title page, which the majority of all division titles in the fifteen instructional modules could be classified: rationale, objectives, pretest, learning activities, list of materials, vocabulary, self-test, post-test, and quest (Kozak, 1975, p. 40).

The rationale explains the value of the module to the student.

The objective is a statement of the competencies related to the terminal performance that the student should be able to demonstrate following the instruction.

The pretest determines what the student already knows. It should allow the student to challenge the contents of the instructional module.

The learning activities include interaction between the student and the instructor, student with other students, and student with equipment and materials. They are alternate approaches concerning how, when, and where to learn.

The list of materials are the materials needed and their locations. The list should include: texts, charts, pamphlets, periodicals, other reading materials, cassettes, films, filmstrips, pictures, slides, etc.

The vocabulary is a list of definitions of new words and/or phrases.

The self-test is used by the student to assess his own learning. It is a protection against public failure. Remember, the student must know what to do if he fails.

The post-test is the final examination that will assess whether the student has achieved the objectives. The post-test should be kept out of the instructional module and should be administered by the instructor.

The quest is an opportunity to go beyond the learned objectives. It is student-initiated and formally-contracted.

(At this point materials were distributed among the participants and an instructional module was prepared by each of the participants. Upon completion, the participants discussed their instructional modules and whether the various divisions met the criteria as presented.)

The industrial arts laboratory situation tends to lend itself to a more readily acceptable incorporation of instructional modules. The industrial arts laboratory has always been a form of individualized instruction - but without the necessary controls and refinements. However, the incorporation of instructional modules does not mean that this "change-over" is easy - as you can see by our activity tonight.

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90

INTERNATIONAL PERSPECTIVE

AIAA. TH-3:45-3.

INDUSTRIAL EDUCATION/TRAINING IN SAUDI ARABIA - OCCUPATIONALLY ORIENTED, COMPETENCY BASED, INDIVIDUALIZED INSTRUCTION.

Clifton P. Campbell and Abdullah H. Bukhary, Ministry of Labor and Social Affairs, Vocational Training Directorate, Riyadh, Saudi Arabia.

No doubt the shortage of skilled workers is one of the main problems faced by developing nations. Fortunately, however, Saudi Arabia is able to address this problem by making use of its resources.

The Kingdom's five year development plan, which is costing billions of riyals, shows its interest in establishing a divirsified and independent economic base. Saudi Arabia's goal is to industrialize, so as not to depend on oil alone. In the past fifteen years, great steps have been taken toward meeting this goal. During this period, Saudi Arabia has achieved what many nations took much longer to accomplish.

The government recognizes that if its industrial development plans are to be realized, a workforce of trained Saudis must be developed.

Development of Industrial Education

Early vocational training efforts, through apprenticeships, were largely unorganized and ineffective. Because of this, the government looked for other approaches to prepare the skilled workers needed. With this in mind, the Kingdom sought international expertise and assistance.

In 1962, an agreement was signed with the International Labor Organization (ILO), calling upon them to supervise the establishment of a number of vocational training centers. The first center was opened in 1964 in Riyadh, with 160 students in nine different trades. Later the number of trades was increased to fourteen, with 450 students enrolled.

The agreement with ILO was expanded to include additional vocational training centers in other parts of the Kingdom. In 1966, centers, each accommodating 350 students, were opened in Jeddah and Dammam. In 1967, a center in Al-Qasim was completed.

In 1969, the accord with ILO expired and the Ministry of Labor and Social Affairs became solely responsible for the Kingdom's vocational training. Since that time, ten additional centers have been established.

In addition to the vocational training centers for students ages 18 to 30, pre-vocational centers have been set up for the younger students, ages 14 to 17. Young men in this age group have inherent potential. If they leave school early and are obliged to wait until they are old enough to enter a vocational training center, they could become a problem to their society.

The Kingdom recognized this situation, and in cooperation with UNICEF, opened pre-vocational centers in Riyadh, Jeddah and Dammam in 1974-1975. Each of the centers began with 80 students, and present enrollment is almost 300. Five more pre-vocational centers will be opening in the near future.

Under a project agreement for technical cooperation in manpower training and development, the U.S. Dept. of Labor is now assisting the Ministry of Labor and Social Affairs in improving and expanding its vocational training system to provide skilled manpower in priority trades.

Instructional Strategy

Competency based, individualized instruction is being implemented in the Pre-Vocational and Vocational Training Centers, as well as in the recently established Instructor Training Institute. This approach will train the largest possible number of skilled workers effectively and efficiently.

Competency based training assures that graduates will have the ability to perform all necessary tasks at the established level of proficiency. It awards advanced standing for prior learning where competencies can be demonstrated.

Individualized instruction permits each student to progress at his own rate of learning, according to personal abilities, needs, interests and learning style. It gives some students the opportunity for early program completion.

Competency based, individualized instruction maximizes student and instructor potential. However, it necessitates the use of well-developed instructional materials which are designed to accommodate individual differences and produce competent graduates.

Modules and Media

The training system being employed centers around generously illustrated printed modules of instruction bound in the form of standardized instructional packages (PAK's). Each PAK is made up of four parts: 1) an introduction and the terminal performance objectives; 2) a precheck with answer key; 3) instructional modules composed of - a) enabling or sub-objective(s), b) training activity, c) resources, d) feedback; and 4) a postcheck.

These instructional packages incorporate the teachable elements required for competent performance of tasks directly related to the job for which a student is preparing. Validated PAK's, when combined in units, will be used to provide training corresponding directly to those functions which constitute an actual job as performed in Saudi Arabia.

Instructional packages and their component modules will be selectively augmented by filmstrips, video tapes, and other forms of media. All instructional materials will be refined to a literacy level which accommodates variations in the educational experiences of participants.

Assuring the Effectiveness of Instructional Materials

The degree of success that is achieved with PAK's and media is largely dependent upon the thoroughness of the design, planning, development and editing that precedes each finished product. Before the training system is implemented, each PAK and mediated component will be subjected to developmental and field testing.

Data collected during each course offering and information on the performance of graduates at the workplace will be used to continually improve the reliability of instructional materials.

Summary

Saudi Arabia is determined to meet its present and projected skilled manpower requirements. The government recognizes the need for trained citizens who can participate in and contribute to the Kingdom's rapidly developing economic base. Consequently, it is updating and expanding vocational training programs. This renewal and expansion in vocational training will assist in attracting, training, and placing skilled Saudi workers in the trades the Kingdom needs to support its industrial development thrust.

A copy of the conference paper, in English and Arabic, is available upon request from: Dr. C.P. Campbell, USREP/JECOR, APO New York

Industrial Arts Education Teacher Preparation in Taiwan

Tien-Jin (Frank) Chang
President of Tower Institute of Technology (Taiwan)

The IAE (Industrial Arts Education) teacher is the cornerstone of IAE. The IAE teacher will directly influence the success of IAE and also will indirectly influence the achievement of the industialization and economic development. In Taiwan, qualified IAE teachers are currently in short supply.

The Shortage of Qualified IAE Teachers

The shortage of qualified IAE teachers, is very serious in Taiwan. An essential survey-- The Research of the Supply and Requirement Problems of IAE Teacher of Junior High Schools in Taiwan, was made recently by Mr. J. K. Chen and Published by Kau-Shiun Normal College on June, 1977. According to this study, the junior high schools without qualified IAE teacher constituted 21.13 percent of all 530 junior high school in Taiwan, and the present IAE teachers who majored and graduated from the industrial education department or industrial arts education department constituted 5.85 percent of all IAE teachers. Chen (1977) stated that the required laboratories of IAE of the junior high schools in Taiwan were 829, but the available laboratories were only 524 in 1976.

The Quality Problems

To address the problems in the quality of IAE personnel, several necessary steps must be taken:(a) the improvement of teacher aptitude, (b) the provision of inservice training,(c) the development of opportunity for advanced study. Therefore, a multiple, flexible program which includes night classes, summer school shop programs, seminars, and advanced study programs, must be launched for a full scale assault upon the problems of quality in IAE.

IAE Teacher Forecasting Formula

For the purpose of effectively and precisely predicting the future IAE teacher's requirement and avoiding the disadvantage and weakness of other manpower forecasting formulas, the special IAE students and teachers prediction formulas were created. They were based upon the following elements: the total population of school-aged children in a given year, the percentage of school-aged children enrolled in primary school, the percentage of graduates from various school levels who are now enrolled in more advanced school levels, and the ratio between IAE teachers and students.

$$I_J = \sum_{K=J-12}^{K=J-10} A_K \times E_K \times S_{K+6} \times C_{K+9} + \sum_{K=J-9}^{K=J-7} A_K \times E_K \times S_{K+6}$$

I = the total of Industrial Arts students
K = a constant value which will be defined by the constant value of J
J = predicting year
A = total school children, age six

E = the percentage of children enrolled in elementary school
S = the percentage of elementary school graduates enrolled in secondary junior high school
C = the percentage of junior high school graduates enrolled in senior high schools
G = the percentage of junior high school graduates enrolled in general academic senior high school

Conclusion and Recommendation

In general, the IAE teacher's problems can be divided into quality, quantity and incentive system problems. There is a very close relationship between these three problems. These problems should be resolved simultaneously for the purpose of improving the IAE system to meet the economic development goals. To effectively solve the problems, the government should play an active role both in financial support and in program development. It is essential to consider an IAE teacher incentive system, both in salary and promotion. The salaries of all teachers in Taiwan should be increased, but the priority should be placed upon those in the IAE program. The salaries of educators have to be increased in proportion to the salary increases of those in industry. Otherwise, the IAE teachers may transfer, in significant numbers, to industry. Also, other teachers may try to find a second job. For the purpose of improving the IAE teacher quality, the traditional IAE teacher training curriculum should be improved. Innovation of the IAE teacher training curriculum should include an updating of curriculum content, an increase of new faculty members, and expansion of training facilities and equipment.

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LEISURE

AIAA. T - 1:15-1

IN PURSUIT OF LEISURE IN A TECHNOLOGICAL SOCIETY. Frank R. Trocki, assistant professor, Industrial and Occupational Education, Mississippi State University, Mississippi State, Mississippi.

It is an established fact that we live in a post-industrial or technological society. The force that has created this new society is Technology. Never before has any society, in such a short period of time (last 100 years), undergone such rapid technological growth. The literature concerning this phenomenon of technological development is replete.

However, as several authors have indicated, rapid technological growth produces rapid social/cultural changes and consequences. No other author has brought this fact out more explicitly and dramatically than Toffler in Future Shock. In short, the "technological engine" has produced and will continue to produce significant changes in our lifestyles, beliefs, attitudes, values, and, most importantly, our relationship with things, places, and people. Nevertheless, one important concept left out of Toffler's work, and that of others who write about technology and its social impact,is leisure. This fact is incomprehensible.

Leisure, as we know it today, evolved as a direct result of industrial/technological development, has become an established element in our daily lives (whether we know it or not), and is predicted to increase in importance in the future. Maybe one of the reasons we do not understand the significance of leisure in a technological society is the fact that we do not know what leisure actually is.

The concept of leisure has been defined in several ways. Many of these interpretations have proved to be either too simplistic or vague. For instance, leisure has been defined as the opposite of work--the time left after an individual finishes work. However, is driving for an hour from work, through rush hour traffic, considered leisure time? How is that time driving to work classified?

Parker's (1971:25-27) interpretation of leisure assists in clearing up this issue. He analyzes the concept of leisure in relation to a person's "life space."--life space meaning the ways or activities people may spend their 24-hour day. Parker's scheme includes five activities: (1) work, working or subsistence time; (2) work-related or work obligated time; (3) existence or physiological time; (4) non-work obligation or semi-leisure time; and (5) leisure, free, spare, or uncommitted time. Parker (1971:27) defines this last activity as "time free from obligations either to self or to others--time in which to do as one chooses." In short, leisure time is the freedom of choosing an activity, such as relaxing, recreating, spectating, or working, without any work, social, or cultural constraints.

It is significant to note that no other societies in the past have viewed leisure in this light. Historically, the meaning of leisure, those activities pursued for self-fulfillment or amusement in pre-industrial societies was influenced, if not directed by, religious, athletic, political, military, or moral ideologies. Leisure was not recognized as part of one's life space as it is today. Instead, to be considered worthwhile, free time had to be associated with one of the above mentioned beliefs. Even as recently as 19th Century England, as Roberts (1970:88) points out: leisure was not valued as a part of life and a type of activity that was desirable for its own sake. The sports that were incorporated into public school life...were promoted not because the schools were concerned that their pupils should enjoy themselves, but because it was believed that team games could exercise

a wider beneficial moral and social influence.

Nowadays, sports played or watched, are valued for the satisfaction and pleasure that they produce as leisure pursuits. Individuals no longer have to invent ulterior motives for enjoying oneself. It is expected.

The question now can be raised as to what has given leisure this type of status. Very simply, leisure today, is a product of technological development. Technology has given people the necessary spare time (life space) to leisurely enjoy themselves, the surplus income necessary for partaking in leisure pursuits, and assisted the development of organizations specifically designed to meet peoples' needs.

Based on these facts, it can be stated that leisure has become a distinct element in our life space--our society. It is predicted to increase in important by the year 2,000. By this date, it has been forecasted, only 5-15 percent of the population in the United States will be necessary to produce all our worldly goods. Our technological society will become leisure-based.

Several individuals support this prognastication. It has been argued that contemporary human leisure is the major determinant of human self-identity. All the activities pursued during free time, form the basis of an individual's values, attitudes and beliefs that effect their behavior toward others and their environment. As Roberts (1970:94) states, leisure gives individuals of technological societies a meaning in life.

However, how are humans expressing themselves, providing meaning to today's technological life? Leisure pursuit in a technological society is actually a mirror reflection of rapid technological development. Individuals, becoming aware of more leisure, are trying to cram as much as possible into their lives.

For instance, racketball is the fastest growing sport in America. The reason, you can play a game in about 45 minutes. Golf, on the other hand, is decreasing in popularity. The reason being, that it takes most of an afternoon.

Our current value system dictates that we cannot afford to appear to be lazy. To do nothing is increasingly suspect. We always have to be doing something. And what will happen if we become more technologically advanced. This question, as well as the implications for education, will have to be studied--soon.

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METRICS

AIAA. TU 3:45-5 and 7-9 PM
COMPOSITES MANUFACTURING TECHNOLOGY AS APPLIED TO AIRCRAFT STRUCTURE.
Charles B. King, Materials and Manufacturing Specialist, Projects Directorate, NASA Langley Research Center, Hampton, Virginia.

Composite materials are being used to manufacture selected components of aircraft structures with the potential for saving weight and costs. Graphite fiber reinforced epoxy resin composites provide high strength, lightweight structure requiring a fewer number of parts and mechanical fasteners for assembly. Ten DC-10 upper aft rudders have been manufactured as a single cocured assembly using a thermal expansion molding process. The composite rudders have demonstrated a weight savings of 33 percent as compared to conventional metal structure. Eight of these rudders have been installed to date on commercial aircraft and have demonstrated excellent flight performance.

Six additional aircraft structural components are under development to provide alternate methods for manufacturing primary and secondary load carrying aircraft structure.

Various molding methods are currently being used to manufacture aircraft parts. Included in these molding methods are thermal expansion, autoclave, and press molding. The actual method used is determined by the part's size, geometry, and the experience and facilities of the manufacturer. Cured parts often require cutting and drilling operations. These operations require special tooling and techniques to prevent splintering and drill breakout of parts and excessive tool wear.

The quality of the composite parts is assured by controlled manufacturing processes and non-destructive evaluation. Cocuring stiffener elements, doublers, and attachment clips along with skins, spars, and ribs reduces the total part count of the assembled structure and the number of fasteners required by a significant amount. The assembly of the final structure includes environmental protection from galvanic corrosion of dissimilar conductive materials, lightning strikes, excessive solar heating and ultraviolet ray degradation of the epoxy resin composite matrix.

100

TEACHING MARKETING IN MANUFACTURING CLASSES

Thomas Wright, Professor and Donald F. Smith, Associate Professor, Department of Industrial Education and Technology, Ball State University, Muncie, Indiana.

INTRODUCTION TO MARKETING

Manufacturing has gained wide acceptance as an area of study for industrial arts; however, not all educators see the study of manufacturing in the same terms. For the purpose of this presentation manufacturing is defined as the managed system for processing materials to meet the needs of man. Contained in this definition are the two major components of a complete understanding of manufacturing; namely

(1) an understanding of ***how materials are changed*** in form through six major types of processes: casting, forming separating, conditioning, assembly, and finishing, and

(2) an understanding of the fulfillment of the ***functions of management*** through exercising ***levels of authority and responsibility*** within the structured ***activity areas*** of research and development, production, marketing, industrial relations, and financial affairs.

Not all manufacturing programs choose to present all five of the managed areas of activity. It seems, indeed, essential to at least present the major product centered areas in all manufacturing programs. They are (1) ***Research and Development*** which designs and develops products, (2) ***Production*** which plans for and manufactures products to stated quality standards, and (3) ***Marketing*** which promotes, sells, and distributes the manufactured product.

The central topic for the remainder of this presentation is marketing: the managed area of activity that is responsible for moving the product from the manufacturer to the consumer. All marketing activities have at least four major functional areas as seen in Figure 1.

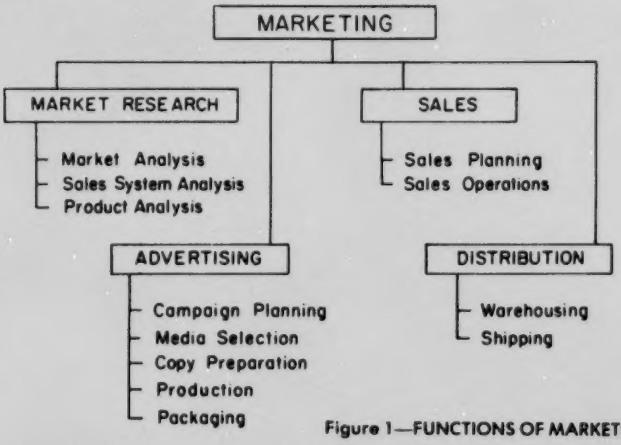

Figure 1—FUNCTIONS OF MARKETING

These areas may be defined as follows:

Market Research Systematically gathering, recording, and analyzing data related to the marketing of products.

Advertising Presenting and promoting ideas, products, or services by an identified sponsor.

Sales Planning and operating systems for transferring products to customers in exchange for money.

Distribution Moving products from the point of storage to the point of use.

MARKETING IN THE STUDENT ENTERPRISE

Several methods may be used to acquaint students with the areas of Marketing described above. Three approaches currently being used in manufacturing programs will be described. All involve students in problem-solving activities while developing Advertising, Sales, and Distribution systems for their companins. Market Research may or may not be involved during the Marketing activities. If comprehensive market studies were performed during Research and Development further research may not be necessary during Marketing.

The first method involves forming a model corporation with Production, Marketing, Finance, and Industrial Relations departments. Each member of the class has responsibilities in one of the four departments. The Marketing group develops the various systems and plans needed to sell the product while the other groups are developing the activities for their respective departments. The Advertising and Sales systems may be implemented either before or after the products are produced.

Using the second approach, the products are produced before the Marketing activities are introduced. After the class studies about the various functions to be performed to market their product each class member selects some aspect to design and develop. They may choose to work individually or in teams.Advertising posters, flyers, radio "commercials", TV "commercials", display case advertising, sales receipt books, and sales training systems are a few examples of projects that can be chosen. Some teachers use the contract method and assign specific point values to each of the various type of projects (Campbell, 1978, pp. 21-22). Depending on class size and the number of projects developed either all or some of the more outstanding projects may be selected for use to market the product.

The third method is also initiated after the production phase is completed. After studying the functions of Marketing the class is divided into Marketing system development teams. Each team is responsible for developing a complete system for marketing the company's products including advertising, sales training program, sales office records, sales receipt books, and warehousing and distribution system. These teams are role-playing as independent marketing agencies competing for the "contract" to market the company's product. An objective evaluation system can be used to select the best system.

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MANUFACTURING

AIAA. TH-3:45-5:00

GOING METRIC IN INDUSTRIAL EDUCATION ABSTRACT: A TECHNICAL SUBJECT ANALYSIS WITH RESULTING IDENTIFICATION OF MINIMUM PERFORMANCE OBJECTIVE, INSTRUCTIONAL TECHNIQUES AND STUDENT EXERCISE DEVELOPMENT.

Arvon D. Byle, Professor, John R. Lindbeck, Professor, Michael B. Atkins, Associate Professor, Department of Industrial Education, Western Michigan University, Kalamazoo, Michigan

American industry is currently involved with a planned conversion to metric designed and manufactured products. This transition involves a change in measurement units, instrumentation and application of new standards.

Industrial education is concerned with instruction about the materials, processes, techniques and standards of American industry. It is then necessary that instructors of technical subjects be aware of the minimum performance that students should demonstrate and the techniques that they can employ to adequately prepare students for employment.

The central purpose of this presentation was to develop and test minimum performance objectives, student exercises and instructional methodology in selected technical subject matter areas. The specific technical areas that the instructional models were developed for were drafting, graphic arts, woodworking, and metalworking.

The procedures included in this presentation were as follows:

1. Perform an analysis of the individual technical areas to determine the minimum expected performance levels.
2. Develop a listing of the minimum performance objectives based upon the results of the analysis in each of the technical areas.
3. Determine the best instructional methodology for efficient communication of metric informational content.
4. Develop and test sample student laboratory exercises for verification of attainment of determined performance objectives.

The following conclusions related to the implementation of metric instruction in technical subjects can be drawn:

1. Clear and concise measurement performance objectives are necessary for the instructor to be able to plan the instructional activities to prepare the students to be competent in the individual technical areas.
2. The developed student exercises were sucessful in verifying the student's competency in industrial metric applications.
3. There is no significant change in the amount or method of skill development instruction necessary when comparing metric to customary manufacturing, production, or designing activities.
4. In designing for metric production of mechanical components, the students were required to develop a better understanding of part relationships within an overall assembly than was expected in customary design experience.

AIAA - T - 9:00 - 10

METRIFY OR PETRIFY. Robert D. Weber, Associate Professor, Division of Industrial Education and Technology, Trenton State College, Trenton, New Jersey.

We can complain because rose bushes have thorns or we can rejoice because thorn bushes have roses! Basically, it's how you view the metric system, either positively or negatively, that may make the difference between metrification or petrification! In the case of the metric system, it appears that some knowledge is better than none at all. A major study conducted by the National Bureau of Standards (1971) noted that the majority of consumers having little or no knowledge of the metric system were opposed to the system. Conversely, consumers who were familiar with the system and had a good knowledge of metrics, unanimously favored the system. Ignorance can very well breed fear and resistance to change. But how ignorant are we? In 1971 only 40% of American consumers surveyed could name one metric unit! (Rochtroch, 1971) If most people don't like the metric system the above survey findings can certainly explain the reason...ignorance.

To dispel that ignorance, educators at all levels will have to make a commitment to the teaching of metrics. It won't be easy. Educators will be faced with "change resistors," increased expenditures for metric hardware/software and the existence, at least for a time, of a dual dimensioning system. But educators will have some help and clout as they launch into this "new" measurement system. Although it was legal to teach metrics in the U.S.A. in 1866, it took another 100 plus years to get things moving. Public Law #94-168, the Metric Conversion Act of 1975, called for a planned voluntary change to the metric system over the next ten years. In this connection, a 17 member Metric Advisory Board representing government, labor, industry, education and the consumer will coordinate the gradual change to the metric system. Impetus will also be provided by manufacturers (IBM, NCR, GM, FoMoCo, Sears) who are currently producing products using metric dimensions. Thus, in our schools there will now be a reason to teach and learn this new system. Previous attempts at metric education met with limited success and enthusiasm, perhaps because we were unable to practice what was preached. Now with this national effort underway, metric theory and practice should be brought closer together.

First steps at metric education will be made at all levels but most importantly in teacher education programs and as soon as possible, at the elementary school level. Many states are already committed to school wide adoption of the metric system. How does one begin? Information has been published which details suggestions for exposing young children to the metric system. (Trueblood, 1973; West, 1974) Much of the metric education at the adult level will result from self instruction using one of the largest selections of literature available on a given topic. The metric system can be as complicated or simple

as each individual demands but attention to ten elements (6 prefixes and 4 terms) appears to be a trade-off somewhere between simple and complex. As you use and learn the system, the three major design features will become apparent, namely:

1. The entire metric system is based on the meter, a standard of length that can be consistently duplicated.
2. Using the base unit, (meter) measures for area, weight volume, and liquid capacity can be derived.
3. The base ten decimal system, similar to our existing monetary system simplifies the system by permitting us to divide or multiply easily.

Like most "frustrating" tasks, the most difficult thing for many of us to do is simply get started using the metric system. But, get started we must if we expect to be called educators who are preparing our charges for productive living in the twentieth century. As you venture forth into the metric system, try to remember that perhaps ignorance and fear will be the biggest stumbling blocks you will have to overcome. Remember too, that perhaps the best teachers are not the "experts" but the person who has just acquired some new knowledge about the American metric system.

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AIAA. TUE-7:00-6.
AN INTRODUCTION TO METRICS IN INDUSTRIAL ARTS. Ronald E. Jones, Center for Occupational Education, University of Massachusetts, Amherst, MA.

Introducing students to the use of Metrics as a measuring system is a necessary task that Industrial Arts teachers must face immediately. The Metric system of measurement is a part of daily living today. Knowledge of processes and materials involved in the production of consumer goods must be enhanced by active involvement in the use of Metrics. Unfortunately, many teachers are not aware of the International System of Units (SI) nor the need to include Metrics in the curricula of public and private schools today.

Proponents of the Metric System have, for years, promoted a planned conversion. The most popular plan was presented in a report to Comgress as a result of the U. S. Metric Study in 1968. This report was presented to Congress by the Secretary of Commerce in 1971. The five recommendations were:

1. Strongly recommend conversion to the Metric System (SI)
2. Recommended a mandatory conversion
3. Recommended a planned conversion
4. Controlled by a central coordinating body
5. Recommended a ten year conversion timetable.

The U. S. Metric Study provided impetus for the Metric Conversion Act of 1975. The Act called for the formation of the U.S. Metric Board and approximately 30 months later, June 1978, the final members were confirmed to membership. Formation of the U. S. Metric Board is the most positive requirement of the Act.

The Act did not require the mandatory conversion. The Act does require the U. S. Metric Board to plan and coordinate the voluntary conversion to the Metric System. Since the committment is voluntary, there is no timetable for conversion and no plan for conversion.

Manufacturing concerns are not waiting for federal guidelines or federal funding to offset the cost of conversion. Major manufacturers have already shifted to the Metric System in the production of goods. Food items, motor vehicles, farm and construction equipment, computers, office equipment, and many others are all being produced to metric specifications. This shift has greatly increased the availability of overseas markets.

The Industrial Arts teacher should be concerned with information about industry and the production of goods. Therefore, the Industrial Arts teacher should provide the impetus for metrication in the school's curricula. This can be accomplished with the help of resource people, references, and the use of media available at little or no cost.

The following listing of resources should be carefully considered as a starting point in the search for information. Some of the sources may be able to provide very advanced level information. An immense variety of additional sources are available. It should be noted that all information gathered may not be consistent and the researcher should be aware of this problem.

One source of information is the U. S. Metric Association, Sugarloaf Star Route, Boulder, CO 80302. An individual membership is $5.00 per year. The USMA publishes a newsletter, quarterly, that contains a variety of general information concerning metrics. Recent issues have devoted one page to the teaching of metrics and education in general. News items regarding federal legislation, the U. S. Metric Board, and highlights of state activities are presented. A listing of

workshops and book reviews are included. Other articles of interest round out the newsletter. The information is current and accurate. An excellent source.

The Northeast Metric Resource Center contains a variety of teaching materials and techniques for metric education. The Center should be contacted through Evan V. Johnston, Director, Room 918 Campus Center, University of Massachusetts, Amherst, MA 01003.The Center provides workshops for teachers, industry, and consumers in the New England area.

The AIAA Metric Speakers Bureau is a listing of individuals who have indicated their willingness to serve as metric speakers and/or consultants. Copies of the Speakers Bureau booklet can be obtained from Ronald E. Jones, Center for Occupational Education, 424 Hills North, University of Massachusetts, Amherst, MA 01003. The Committee is constantly searching for new consultants to be included in the listing. Individuals listed may offer workshops, seminars, formal classes, speaking engagements, curriculum planning, or metric resource center information. Any individuals interested in becoming a member of the Speakers Bureau should contact Ronald E. Jones. An application form is available in the Speakers Bureau publication.

Many sources of information are available to the individual. Contact with local and state agencies should provide some information and guidelines for local implementation policies. Manufacturing concerns, private companies, and individuals offer metric information and services. Individuals should obtain help from qualified sources to determine the quality of information available from these sources.

Over 90% of the world population is functioning with the metric system of measurement. The United States is the last remaining major industrial power not committed to the metric system. The "quiet revolution" is continuing and the move toward metrication is constant. Let this be the opportunity for Industrial Arts to take the lead in education in implementing the metric system of measurement in the schools in our nation.

MISCELLANEOUS INSTRUCTION AREAS

INDUSTRIAL ARTS AND MEDICAL DEVICES? James F. Fales, assistant professor, Department of Industrial Education, Purdue University, West Lafayette, Indiana.

Industrial Arts: General Education

All persons in our society should have some general knowledge of how their daily lives are directly or indirectly affected by tools, materials and processes. We have only to look around us to begin realizing that all material goods we have are produced by the industrial element in our society. What products are most often used as examples of these concepts? Automobiles, airplanes, TV sets? Tools, materials and processes also touch our everyday lives in many ways which we seldom comprehend. Medical devices represent still another need for understanding the system that provides us with material goods.

Medical Devices

The general public knows little or nothing about medical devices. These devices, however, are conceptually no different than the often cited examples of automobiles and television sets with regard to their development and manufacture. Medical devices, such as a heart pacer, ophthalmic cautery, stimulation electrodes, and the like, represent products that require knowledge of materials (wood, metal, plastics, ceramics), processes (forming, shaping, casting, cutting, assembling), and systems (electronics, hydraulics, etc.).

All medical devices can be classified into one of three general categories. Diagnostic devices are used by the physician to measure or collect information. Therapeutic devices are used by the physician to halt or cure illness or disease. Rehabilitative devices are life supportive or life assistive, and are used by the patient. Representative samples of these devices are shown in figure 1.

Conclusion

We need to continue to alert guidance counselors, and the public in general, that industrial arts can be of value to all students regardless of perceived career goals. Perhaps using medical devices as examples, in addition to more commonly recognized goods (calculators and cars), can help us toward that end.

MEDICAL DEVICES		
DIAGNOSTIC	THERAPEUTIC	REHABILITATIVE
stethoscope	forceps	artificial hip joint
EKG & ECG electrodes	syringe	heart valve
tongue depressor	catheter	heart pacer
thermometer	suture	dialysis machine
sphygmomanometer	scalpel	
. . .	. . .	. . .

Figure 1

PLASTICS

AIAA. W-10:45-5.
PAST AND FUTURE PERSPECTIVES OF PLASTICS. Dr. Harry L. Campbell and Dr. Gary Weede, Dept. of Industrial Technology, Illinois State University, Normal, Illinois.

Let us trace the literary origins of plastics in industrial arts related magazines. Those reviewed were: AVA Journal, IAVE, Industrial Arts Magazine, M/S/T, School Shop and Journal of IA Education.

The IA Magazine, Feb., 1916, reported a class in vulcanizing car tires using a shop-built steam vulcanizer. No articles appeared in the 20's. We could read from Smith(1930) that drawing triangles could be fixed by using acetone and shavings from old triangles. Celluloid sheet was used by Frisch('31) to protect drawings. Skomp('37) wrote of molding, casting and machining of plastics in the school shop. He noted a limited future for plastics in the shops due to cost of equipment.

In May, '40, "Modern Plastics" by Dunham, appeared in IAVE suggesting use of plastics within the shops using wood and metal hand tools. From '42-'44, Peterson had 5 articles saying that IA classes should study plastics as an industrial material. Course content, dies, processes and equipment were explained in detail. Roberts('44) wrote of acceptance of plastics as a craft medium since materials were available. Osburn('45) said we should study strength of plastics, shape, physical characteristics and design principles. Dolan and Shultz('46) wrote the 1st course outline in plastics in IAVE. Cantor('49) followed with a course which had 15 projects from major plastics processes. Greenwood's ('49) 2 articles recommended plastics courses be on a level with metals. Hood('50) countered that plastics should be in wood classes since the tree was the basic raw material for plastic materials.

Few articles appeared in the 50's. Bick('55) authored 7 industrially oriented articles relating that plastics could be a course by itself or could be integrated within other IA areas. Swanson('55) wrote that IA objectives demanded emphasis on interpretation of industry and plastics deserved more than just craft emphasis.

The '60's had many articles. The AVA Journal had its 1st article concerning plastic education(Johnson and Anderson)in '61. School Shop showed their 1st in 4/'62, by Shields. He encouraged educators to catch up with this growing industry and for plastics as a core course. The Journal of IA Ed. got its 1st in Jan.,'64, aimed toward IA educators to update teacher ed. programs in the college and universities.

Steele was a major writer during the'60's. Articles in IAVE and School Shop included rationale, curriculum proposals, equipment ideas and processes information. Help for teachers could be found from the Society of Plastics Ed. for program planning and processes information. Runalls wrote in School Shop, that 30% of teacher ed. schools reported undergraduate work in plastics. Of that group, acrylic work was prominent with limited attention given to production processes.

The '70's, perhaps reflecting an assumption that plastics had found its place in IA programs, most articles have related equipment, small project, new processes concepts and ideas. Steele suggested ways of buying Plastics Shop Equipment in Mar., '73, School Shop. In Jan., '72, serious consideration was suggested for a vocational plastics cluster. Weede and Shipman('74) related plans for a shop grinder. Keroack('75) presented an update on plastics industry. It is no longer unusual to find at least 1 article about plastics in a monthly edition of an IE magazine(exception: AVA Journal). Perhaps plastics ed. has arrived! After reviewing the '76-'77 ITE Directory, only 60 of the 246 institutions listed had the area of plastics listed. This is less than 25%! Does this reflect current interpretation of industry at our colleges?

Looking ahead to the year 2000 the progress of plastics will be influenced by the restraints on the supply of raw materials and energy and the restraints of legislation. However, there will be sufficient material for a 450% increase in plastics products by the year 2000. The greatest growth will occur in polypropylene(14 million metric tons by 2000 compared with one million tons in 1974). These predictions are based on new technologies that will include processing with lower energy consumption, reduced capital investment requirements, and high efficiency product yields from raw materials. As petroleum supplies dwindle and cost go higher coal will take its place. The U.S. reserves of coal are estimated at 3.2 trillion tons which is the energy equivalent to three Saudi Arabias according to Continental Oil Co. Illinois has enough coal to last the plastics industry 300 years. Gasification/liquefraction technology will initially supply the raw materials for plastics. This technology will be accompanied by that which will make conversion of waste wood and oilseed crops economical and cost competitive. By 2000 the technology will be perfected to extract the basic building blocks for plastics from waste plastics-the near ultimate form of recycling.

The major legislative issues involving plastics are toxicity, combustibility, safety and ecology. While the legislative impact will be great it will not necessarily be bad. Legislators will have to be educated about plastics in order to make intelligent decisions. Despite the recent vinyl chloride monomer legislation PVC production will increase 500% by 2000. Acrylonitrile that replaced PVC in bottles came under attack and was quickly replaced by PET. In each case the legislation resulted in progress not set-back. Research is the key to keeping startling revelations such as flammability from creating a public storm of controversy. Additives, fillers, coatings, and chemical structures will be the solution.

The implications for plastics education are both awesome and exciting. Our success will depend on receptiveness and preparedness for what is coming. We can look to the past to see which path was taken not only in plastics education but in the evolution of metal and wood pedagogy. We must fully realize that those patterns will not work in the future for plastics because the growth rate is much greater for plastics. The other material areas have not and will not experience the growth that is just beginning for plastics.

Since plastics education is lagging behind traditional areas of study many people have to be educated as to the future of plastics. Those who make curriculum decisions have to be informed and challenged to work with the plastics teacher to provide students with the knowledge we know they will need in the near future. Concurrently plastics educators have to cooperate and pool their efforts in identifying and solving common problems. Curriculum needs to be developed with the philosophy that rapid change will be a major component and changes should be made at regular intervals as efficiently as possible. Students should be made aware of the overall industry and what to expect in their lifetime and not be limited to just fondling a shiny piece of acrylic. Industrial literature must continually be screened and adapted to the various levels of our educational programs. New activities will be a byproduct of the subject we are teaching. The relative costs of teaching materials may actually decrease through new technologies and expanded utilization.

No technology can stand alone. Therefore, the building of a plastics empire in any education institution can only retard the process. Promotion of electrical, fluid power; computer controls, and other technologies will strengthen and enhance a good plastics education program.

AIAA. TH-2:30-4.

INITIATING PLASTICS STATEWIDE. Dennis Hirsch, state specialist, Industrial Arts, Tennessee Department of Education, Nashville, Tennessee, John Gill, director, Educational Services, Rohm and Haas Company, Philadelphia, Pennsylvania.

Traditional industrial arts content revolved primarily around the four areas of mechanical drawing, electricity, woodworking, and metalworking. Traditional courses were of the unit shop type, i.e. metalworking, woodworking, etc.

This was especially true in Tennessee as became apparent when the administration and supervision of industrial arts was transferred from the Division of Instruction to the Division of Vocational-Technical Education within the Tennessee Department of Education in 1974. This transfer provided for the addition of three field specialists for industrial arts working under the supervision of the state specialist. This expansion of staff allowed for better on site visitation and supervision. The field specialists quickly discovered that very few activities were being provided in any of the more contemporary areas such as graphic arts, power technology, plastics, manufacturing, construction, etc.

This discovery led to the development of a proposal for the funding of eight district workshops for "initiating plastics instruction" across the state. The workshops were designed to meet three objectives which were 1.) to provide basic technical information, 2.) to develop fundamental hands-on skills, and 3.) to encourage the increased use of acrylic plastics in manufacturing and general industrial arts multiple activity courses. The workshops were held throughout the 1975-76 school years.

It was felt that many elements needed to be pulled together to assure the success of such a venture. Outlined below are some of these elements.

Travel, meal, and lodging expenses were provided for the teachers who would be coming into the major centers of program concentration for the workshops. The workshops were designed to provide much information and many activities in a short time period, nine-to-ten hours split between two sessions, a Friday evening - Saturday morning combination or a back-to-back week night combination. Meals were usually catered to the sight or provided for the group at a nearby cafeteria to cut down on loss of workshop time. Outside technical expertise was provided by the Rohm and Haas Company and two local companies, Norrell Plastics of Memphis and Metroplastics of Nashville. Both of the local companies have followed up support by supplying industrial arts programs with cut off plastic at a very low cost or new plastic sheet as well as supplies at a discount. The Division of Vocational-Technical Education purchased for all general industrial arts programs the "World of Acrylics" teaching program which gave the teachers the necessary software materials. These programs were presented to the teachers at the conclusion of the workshops. Finally, the teachers were encouraged to purchase necessary equipment, materials, and supplies from supplemental grants that have been made available

through the Vocational-Technical Division for the past three years starting in 1975-76. Approximately 400 out of the possible 550 industrial arts teachers in Tennessee attended one of the workshops and all came away highly pleased asking for more workshops of this nature.

As all of these elements start mixing together, the field specialists now are seeing another major industrial material being used to teach about industry. Plans are to expand beyond acrylic sheet plastics and into more areas as similar professional growth activities can be held.

The Tennessee Department of Education will provide details of the proposal to any interested professional association, teacher training institution or education agency upon request.

AIAA, Th-3:45-2
PLASTICS INSTRUCTION-AN EXPERIMENTAL APPROACH. Gerald L. Steele, professor, Industrial Education & Technology, Ball State University, Muncie, Indiana.

Many industrial arts subject areas are taught via the project approach. The project is often the central theme. In such classes the student usually constructs projects which are graded on accuracy, workmanship and finish. It is almost as if they were to be works of art. Students often design the project - a factor which is usually graded. Such project making usually is not representative of industrial production, however.

Industrial plastics processing does not lend itself to the single project method. In the case of injection molding, compression molding, extrusion, blow molding and roto molding, to name a few plastics processes, the student is usually not capable of designing and constructing a mold prior to learning the process. Therefore, a mold must be provided. What is left for the student to learn after he has produced a few products on the mold? He could learn to change the processing variables - i.e: time, temperature and pressure to get different results.

The approach to teaching plastics processing taken by this author is just that. Students run controlled experiments changing one variable at a time, for example - in injection molding the material, mold, machine, time and temperature might be held constant while the injection pressure is raised 5 psi after each 5 parts are molded. The results of this experimentation are recorded on a molding log sheet which is part of the laboratory manual. A sample log sheet is shown on page 2. This is evaluated on the basis of accuracy, neatness and completeness along with the molded products.

If specification sheets are available for the material used, data such as specific gravity, melt index (flow number) and cost per pound, may be found. This information may be used to determine specific uses for each given material. A lesson on melt index and specific gravity is a natural follow-up after students learn how to find the data required.

Obviously an experiment will result in both good and bad parts. From this, the student should learn to adjust times, temperatures and pressures in plastics molding processes using data obtained from previous experiments. Certain rules of thumb, such as setting the injection molding cylinder temperature 100°F above the melt point of the material, are a part of this learning process.

It can be seen that there is more to plastics instruction than just teaching how to fill a hopper, pull a handle and remove a part. By using controlled experiments students can learn the results of variable changes. By properly recording these results and data on the materials used they can learn to properly select materials. By studying the data and what it means they can learn cause-effect relationships.

INJECTION MOLDING LOG SHEET

MATERIAL					MACHINE - MOLD					PARTS	
EXP. NO.	NAME MFGR. CODE	DENSITY OR SPEC. GRAV.	FLOW # OR M. I.	COST PER LB.*	MOLD TYPE TIME	INJECTION FOREWARD	MOLDING TEMP.	GUAGE PRESS.	NOZZLE PRESS.	NO. PARTS	RESULTS

*COST PER POUND CALCULATED ON SMALLEST QUANTITY AVAILABLE

118

PUBLIC RELATIONS

AIAA. W-3:45-5.

Effectiveness of Motion Pictures in Industrial Arts Public Relations, Gerald G. Lovedahl, Visiting Assistant Professor, Industrial Education, Clemson University, Clemson, S.C.

Industrial Arts is, and for many years has been, suffering from an identity crisis. Although most individuals quickly associate a mental image (right or wrong) with the term "shop", these same individuals are at a complete loss when it comes to describing industrial arts. What we need, therefore, is a "message" directed at parents, administrators, and other individuals not directly involved with industrial arts.

In-class visitation would be a direct, meaningful experience for many of the individuals mentioned above, although most certainly limited in scope. Furthermore, the time available for such visits, on the part of both the classroom teachers and interested visitors, is at a premium. The only alternative, therefore, is a contrived experience consisting of a combination of audio and visual stimuli to present our "message". Slide-tape presentations have been used successfully by many individuals in their public relations campaigns. However, one of industrial arts greatest assets is action, and this action, or motion, is lost in still transparencies. Still-picture techniques can imply motion, break it down into its components, and freeze it for convenient study; but where movement or a series of movements is important as an integrated operation, only motion pictures can depict the sequence completely and adequately.

The best medium to convey our message then, is either 8 MM or 16 MM motion pictures. Sam Gold wyn once said that "Messages are for Western Union". However, as Robert W. Wagner and other experts in the field proclaim, there is a message in every film regardless of whether or not it is a documentary, educational, entertainment or training film.

Once the decision has been reached to employ the film medium in your public relations efforts, such factors as technology, environment, audience, design and philosophy need to be considered.

The decision made dealing with the format (8MM or 16MM) is one related to the technological factors. The following chart depicts the differences between the two formats in regards to certain technical, aesthetic, and pedagogic elements. It should be kept in mind that this chart is by no means absolute, with exceptions possible.

	Small Format		Large Format
1.	Information function	1.	Transformational function
2.	Small screen	2.	Large screen
3.	Individual or small-group viewing	3.	Large group viewing
4.	Short attention span required	4.	Long attention span required
5.	Specific content	5.	Generalized content
6.	Precise, parsimonious	6.	Ambiguous, provocative
7.	Short, repeatable fragments	7.	Long, total experiences
8.	Close-up images for limited screen	8.	Long-shot images forexpanded screen
9.	Logical, linear, continuity cutting	9.	Non-logical, dynamic cutting
10.	"Straight" photography	10.	Non-representational photog.
11.	Supportive use of sound	11.	Psychological use of sound
12.	Daylight or room light projection	12.	Darkened environment projection
13.	Programmed use	13.	Non-programmed use

14. Immediate feedback	14. Delayed feedback
15. Continuous usage and accessibility	15. Limited usage and accessibility

The decision between the two formats is dependent upon the specific public relations situation to which the film will be applied. Furthermore, there is an obvious difference in the cost of producing the two formats, with 16MM being by far the most expensive.

Another of the factors deserving close attention is that of the audience for which the film is intended. In considering the audience, we are asking "what do we want the audience to do after seeing the film"? If the film is being produced or selected for public relations application, we would be most interested in bringing about a change in attitude, as well as increasing the audience's knowledge of industrial arts. As Greenburg (1946) stated "any film attempting to impart information will also have an effect on attitudes, and any film for changing attitudes will necessarily impart information".

We need to state our objectives for the film in terms of the changes which we wish to bring about in the attitudes and knowledge of the audience as a result of viewing the film and these objectives should be measurable. The film which you will see later in the program was planned according to objectives stated by the filmmaker, and the audiences were tested to determine the extent to which the objectives were fulfilled.

Another consideration pertaining to the audience is that of pinpointing the type of people who comprise it; the target audience. This might be accomplished through audience analysis, when possible. The more closely the film is designed for a particular audience, the greater the chances for the desired changes in behavior.

The film you are about to see was produced in 1975-1976 by myself, and funded by the Ohio Industrial Arts Association. This fifteen minute, color film was a result of documented need across the state for a film which could be utilized to depict industrial arts activities at all grade levels, to a wide assortment of adult audiences. It was the first 16MM film ever produced by the filmmaker, and was accomplished at a cost of $2175.12 to the association, with no charge made for the filmmakers several hundred hours of labor. This compares to a standard cost of $1000.00 per minute for commercially prepared 16MM films.

The film begins with industrial arts activities at the elementary school level, and proceeds through the middle school to the high school classes. Schools from across the state were included in the filming, and a representative sampling of programs is depicted.

The film was a tremendous success, based upon the testing which preceeded its completion. As a result of subjecting the data to analysis of variance, the following primarily findings resulted.

1. The film resulted in a positive change in attitude significant to the .001 level of confidence
2. The film resulted in a positive change in knowledge (cognitive) significant to the .05 level of confidence or above.

Based upon the findings of the study described above, it is therefore concluded by the author that the film medium is effective in improving public relations. We can ill afford to complain about the situation in which we now find ourselves; that of describing our chosen field as "shop" in an effort to communicate with those outside the field, unless we are willing to attack the problem of public relations. The film medium is a proven avenue for such efforts.

PUBLICATIONS

AIAA. TU-2:30-3:30
NEWSLETTER PUBLICATION. Merle A. Denning, retired from Drafting and Visual Communication Education, Tucson School District, Tucson, Arizona.

INTEREST: There must be a real generated interest within the framework of the State Association to further the production of any publication such as a NEWSLETTER.

EDITORSHIP: Some State Associations change editors periodically, some retained for a long time because of years of service and experience while others are selected by their capability in handling the management of contracts, in the art and design of the production and general knowledge of page content layout. Retired personnel, who have had experience in art work and the general facets of photography along with off-set printing, are the most qualified to be an editor.

The responsibilities of the editor could fall under classifications such as full management and advisory board. Full management would give the editor full reign in decisions as to contracts, number of issues, publication dates, securing and accepting articles, coverage of conferences and the minutes of executive and association meetings.

An editor working under the supervision of a State Association's advisory board may find his effectiveness impeded, thus many good ideas might be a complete loss to the Association. Yet, on the aspect of this type, many upsetting and illogical articles could be circumvented since all contents must be approved by the advisory board.

A managing editor sends form letters with a contract to prospective and continuing advertisers announcing the rates (or any changes) per issue, number of issues per school year and the deadlines for materials or changes in the structural ads. This is done during the months of June and July in order to prepare for the first issue in the later part of September, soon after school has started in order to make a concerted effort toward membership in local, state and national associations.

PRINTING: The cost of printing a newsletter varies as to the method used. Be it typed, mimeographed, ditto, zeroxed and hot lead or photo offset printing, the cost will have a wide margin according to locale and the number of copies.

MAILING: Mailing can be a big problem for some associations or the editor. Most non-profit organizations use the 3rd class mailing permit which requires 200 or more of the same be mailed. General postage is used when the number of mailings is small. It is always a big question as to who is to receive the publication. Is there any state dues money put into the publication? Is it a complete mailing to all Industrial Arts teachers, coordinators and supervisors? Or just to the membership who have paid their dues?

PAGE SET-UP: Set-up as to pages depends on the amount of contract advertising and material submitted. The cover is generally designed to carry a THEME along with related material on the inside pages. Color (or colors) play an important part on the cover to make an impact on the reader.

PAGE CONTENT: The content can vary as to what is to be conveyed to the reader in the form of articles or pictures.

Articles of interest in the Industrial Arts teaching profession come from various noted persons.

ADVERTISEMENTS: The income from advertisers' contracts cover the cost of printing, mailing plus permit and editor expenses. Percentage of square inches for AD space leaves approximately 40% for cover, articles and pictures.

POLICY: To accept articles, pictures, etc. from all interested Industrial Arts personnel must have provision that all submitted materials are subjected to either editorial changes (within reason) or condensed to allocated space.

AIAA T-10:45 - 4

TEXTBOOK PUBLISHING AND THE CLASSROOM TEACHER. Mark W. Huth, Supervising Editor, Industrial Education, Delmar Publishers, Division of Litton Educational Publishing, Inc., Albany, NY

As professionals who have made a decision to devote part of their lives to helping others learn, teachers have a wealth of experiences, perceptions, knowledge, and skill. The teacher can make a major contribution to the profession and the students it serves if he will publish his wisdom, so that others may share it.

A frequent concern of new authors is whether they *can* write a textbook. The question of being able to write a textbook seldom refers to a lack of any specific ability – simply the often encountered fear of the unknown. The purpose of this presentation is to make known some of the unknown and, thereby, encourage more of our teachers to share their wisdom.

The titles of the personnel involved may differ among publishers, but the functions are the same. The greatest difference is in the nature of the materials they publish. The new author should familiarize himself with the types of materials published by the various publishers before deciding where his initial inquiry will be.

In most cases, the initial planning for a textbook is begun months before the author is selected. The procedure outlined here is typical and should give the aspiring author an idea of what happens behind the scenes.

The editorial department is organized in divisions, each of which is associated with a particular discipline. The division is supervised by a managing editor who has a background in that discipline.

The first step begins when the managing editor identifies an unfilled need for a text or series of texts. This need is confirmed through market research. At some point the management of the publishing company determines that there is sufficient need for textbooks in that discipline to justify continued investment.

The search for a consulting editor is started. The consulting editor is the "engineer" of the textbook series. This is an individual who has a reputation for leadership in the profession and is widely accepted as an expert in the discipline. The consulting editor assists the managing editor in writing specifications for the series. The specifications include such things as the inclusion of behavioral objectives, the amount of illustration, how metric units of measure should be dealt with, what kind of application material should be included, etc.

After the specifications have been finalized, the acquisitions editor initiates the search for authors. One source of authors is a file of letters of inquiry. Many of the most widely accepted textbooks presently available were written by authors whose writing careers began with a letter to an acquisitions editor indicating that they would be interested in writing a book. The acquisitions editor might also contact schools with exemplary programs, state education departments, and leaders in the profession, requesting names of potential authors. Unfortunately, there are many excellent potential authors who are never contacted, because they have not made themselves known to publishers or state and national organizations.

The acquisitions editor provides copies of series specifications, general manuscript specifications, samples of publication proposals, and answers to any questions the potential author might have. The author writes a proposal consisting of a table of contents and

one chapter. When a proposal appears to fit the specifications, it is passed on to the managing editor for acceptance or rejection.

Rejection of a proposal does not necessarily infer a lack of quality. The author should contact other publishers who publish similar materials. With revisions, the same proposal may be accepted by the second publisher.

If the proposal appears acceptable to the managing editor, it is reviewed by the consulting editor. The consulting editor makes recommendations for acceptance or rejection. When the proposal meets the approval of the consulting editor and the managing editor, a royalty agreement is offered to the author.

At this stage, the author begins writing the textbook in earnest. As the writing project gets underway, the managing editor provides feedback based on the initial chapters. In order to provide this immediate feedback, the managing editor generally requests that chapters be mailed one at a time as they are written.

During the writing of the manuscript, the consulting editor provides feedback about how the manuscript meets the specifications. The manuscript may also be reviewed by other experts in the technology involved.

When the final chapters are received, an associate editor is assigned to the project. The associate assimilates all of the comments from the reviewers, then makes necessary adjustments. The associate editor is in close contact with the author during the editorial processing, making suggestions for changes and seeking clarification where needed.

When the edit is completed, the marked up manuscript is copy edited. This involves making grammatical corrections and a final reading to make sure the manuscript is ready for typesetting.

Heavily marked portions are retyped and the manuscript is returned to the author for review. At this point the author makes any last minute corrections and insures that his intent has been maintained.

The author returns the corrected manuscript and typesetting is done. When final preparation is complete, page proofs are returned to the managing editor and the author for a final review before it is delivered to the printer.

Educational publishing is a complex activity, requiring an extensive editorial, production and marketing staff, but the theme is support and assistance for the author. The need to encourage and assist the classroom teacher, who is in close contact with both the subject matter and the needs of students, is basic to educational publishing. The teacher who is looking for an opportunity to contribute to his profession and gain a rewarding experience should not be apprehensive about writing a textbook.

RESEARCH

AIAA. T-2:30-5
IDENTIFYING TEACHER COMPETENCIES IN PRODUCTION. David I. Joyner, Chairman, Department of Industrial Arts Education, Old Dominion University, Norfolk, Virginia.

Competencies for industrial arts teachers can be identified through research. This is the initial step which must be taken in order to establish a sound basis for a viable and consistent teacher education curriculum which meets the contemporary needs of the profession and the demands for accountability. The need for identifying specific teacher competencies has been intensified by the recent emphasis on competency or performance-based Teacher Education. The CBTE movement is often cited as having great potential for bringing about positive change in teacher education. According to Houston (1973,38), CBTE demands rigorous reliance on clearly stated, explicit objectives which are derived from the role of the practitioner and set the parameters for both instruction and evaluation. These are important principles in curriculum design and instructional methodology whether one chooses to employ innovative or the more traditional educational procedures. The basis for meaningful objectives has always been expected outcomes of instruction or, in teacher education, competencies which an industrial arts teacher must possess to do an effective teaching job. These consist of both professional and technical competencies which must relate to universally accepted content areas of the subject field.

Since the beginning of the century, the discipline of industrial arts has been perpetuated through many societal changes. The configuration of the discipline has evolved through the years in response to research and philosophical debates. The stages of this evolution have included: the manual arts era, the bird-house era, the unit shop era, the general shop era, and the recent emphasis on conceptual teaching which emerged as a result of research efforts during the 1960's. These changes are reflected in existing industrial arts programs across the nation. Although the exact designators vary due to healthy philosophical differences, the profession has come to accept Energy, Power, and Transportation; Communications; and Production as its major curriculum areas. Since studies have identified professional competencies which are expected of teachers (Cotrell and others, 1971), the task of identifying technical competencies in each of the major curriculum areas is a task which must be accomplished.

Old Dominion University has an established curriculum which is structured around the three aforementioned curriculum areas. In addition, we have devised a method for identifying teacher competencies. As a starting point, the curriculum area of production was chosen for the research project (Joyner, 1977). The methodology included the verification of teacher tasks (potential competencies) designed by a team of teacher educators by secondary school industrial arts teachers; the use of factor analysis techniques to analyze the data; and the drawing of conclusions which impact program evaluation and change. The research identified 81 competencies needed by the teacher of industrial arts production courses. The relative importance to and the extent of utilization by teachers was computed for each competency. Factor analysis was used to group the competencies into seven clusters as follows:

(1) Materials Forming Practices
(2) Construction Practices
(3) Materials Separating, Assembly, and Finishing Practices
(4) Management Practices
(5) Materials Removal Practices
(6) Secondary Materials Forming Practices, and
(7) Materials Separating Practices

The findings of this study provided an empirical basis for the identification of teacher competencies. Thus, the perceptions of teachers were used to temper the judgement of teacher educators in designing a more meaningful curriculum. The extension of knowledge in this area has many implications for teacher education programs which seek to better serve the needs of teachers. This may be accomplished by providing content in the form of meaningful clusters and emphasizing learning experiences which generalize across competencies within clusters. Additional research is needed to identify teacher competencies in the areas of Communications and Energy, Power, and Transportation.

FOOTNOTES

1. Cotrell, C.J., et al. Model Curricula for Vocational and Technical Education: Report No. 1, Performance Requirements for Teachers. The Ohio State University, 1971.
2. Houston, W. Performance Education: Strategies and Resources for Developing a Competency-Based Teacher Education Program. New York State Education Department and Multi-State Consortium of Performance-Based Teacher Education, 1972.
3. Joyner, D.I., Identifying Production Competencies Needed by Virginia Industrial Arts Teachers. Unpublished Ed.D. dissertation, Virginia Polytechnic Institute and State University, 1977.

AIAA. T-3:45-1

THE ROLE OF MARKET RESEARCH IN THE MANUFACTURING ENTERPRISE. Wayne D. Andrews, assistant professor, Department of Industrial Technology, Illinois State University, Normal, Illinois.

The focus of this presentation is on market research. More specifically, market research will be defined and its purpose and uses explored. An examination will be made of the three primary methods of doing market research. These are the historical, experimental and survey methods. Lastly, suggestions are given to help the secondary school teacher apply the information contained herein within a school manufacturing program.

In order for a company to remain competitive it must improve or introduce products tha t satisfy consumer wants and demands. The function of market research is to provide data that can be used in making decisions concerning product change or a shift in marketing strategies. In a real sense, market research is an intelligance function of a company. The American Marketing Association has defined market research as, "The systematic gathering, recording, and analysing of data about problems relating to the marketing of goods and services" (Report, 1961). The nature of the information to be collected is related to the various facters that go into the marketing of a product. These facters are genrally referred to as the "market mix" because they are the ingredients that must be blended by managers in order to get the right product, to the right person, at the right place, for the right price, at the right time. The mix consists of: product, price, place, and promotion. Let us now examine each of these elements in turn. This will be accomplished by identifying the questions most commonly addressed by market research related to each element. The first series of questions relate to the consumer.

Consumer market research seeks to answer such questions as:

1. What are the consumer's wants and needs?
2. What are the consumer's likes and dislikes?
3. How many buyers are there within various segments of the market?
4. How much money do various consumers have to spend?
5. What are the attitudes of consumers toward various products and firms?
6. What brands of products do various consumers purchase?
7. What facters influence consumers?

The above list is not inclusive but does help one to begin to understand the role of consumer market research. The next series of questions examine product market research.

Product market research is concerned with the following questions:

1. Which of several alternative designs will most likely be successful?
2. What specific features should the final product have?
3. Should the product be available with selected options?
4. What colors should the product be offered in?
5. Which of several packaging alternatives has the greatest aesthetic appeal?
6. Is the delivery and distribution system effective?
7. Can reasons for poor sales performance be identified?
8. How does your product compare to your competitors?

Again the above list is not inclusive but sheds some light on to the questions addressed by product market research. Next let us consider the issue of price.

Price market research seeks answers to the following questions:

1. How much should the product cost?
2. How much are people willing and able to pay for the product?
3. Should the price for the product be uniform in all markets?
4. What is the price/quality/service relationship?
5. What is the relationship of price to quantity demanded in the market?

Perhaps the greatest effort in market research is directed at finding answers to the questions of price. Questions related to place will now be addressed.

Place market research addresses such questions as:

1. How will goods be distributed? Will direct sales or wholesale and retail strategies be used?
2. Will the product be sold under various labels?
3. How can intermediary agents be motivated to sell the products?
4. How many warehouses will be needed and where?
5. What forms of transportation will be needed to get the goods to the appropriate places on time?

The final questions to be uncovered deal with the promotion of products.

Promotion market research is directed at finding answers to such questions as:

1. How much money should be allocated to various kinds of advertising media and in what locations?
2. What characteristics of the products should be emphasized in the various markets?
3. Should promotions using coupons, deals, or premi ums be used?
4. How effective has advertising been in the past with simil.ar products? (Questions adapted from Myers and Mead, 1969, pp. 23-46).

So far the elements of the market mix have been examined by looking at some of the questions to be answered. Now let us examine briefly some of the methods used to gather market research data.

There are three primary methods of collecting data for market research. They are historical, experimental and survey research. Historical research is primarily concerned with the identification of information, trends and other events that have occurred in the past. It can be a powerful aid in decision making provided that one fact is kept in mind. Events that happened in the past did so because a variety of conditions in the market remained unchanged or changed uniformly as time passed. Experimental research is the most powerful research tool available. Its aim is to establish cause and effect relationships. It involves,as the name implies,experiments. Finally, the last method used in survey research. This is the most commonly used data collection technique. It always involves either direct or indirect observation of some behavior. Frequently used survey methods are: mailed questionnaire, non-directed interview and direct observation. Each of the aforementioned data collection techniques has advantages and disadvantages that should be explored prior to use.

There are two ways in which this material can and should be used by the manufacturing teacher. First, introduce the students to the concept of market research---what it is, why it is used, how it is done and how the information can aid in decision making. The second way is to have the student experience or do market research related to a product which is being manufactured in the classroom. Suggested activities will be supplied by the author upon request.

FOOTNOTES

Myers, J.H. & Mead, R.R. The Management of Marketing Research. New York: Intext, 1969.

AIAA, Tu-1:00-3

THE STATUS OF MINORITIES IN INDUSTRIAL TEACHER EDUCATION IN AMERICAN COLLEGES AND UNIVERSITIES. William A. Bakamis, Professor of Industrial Education and Coordinator of Vocational Education, Washington State University, Pullman, WA 99164.

Ever since the passage of civil rights legislation, colleges and universities have been actively involved in seeking ways to increase the number of minority faculty members in the various disciplines. Industrial Education along with other disciplines, has made some progress, but industrial teacher educators still ponder the question: "How must progress?"

PURPOSE OF STUDY

To find the answer to the question a study was undertaken by the author to investigate the status of minorities[1] in industrial teacher education in American colleges and universities. Data was sought in four major areas of concern:

Number of full-time and part-time minority faculty members.

Potential teacher educators as determined by number of minority students enrolled in undergraduate and graduate teacher education programs.

Problems in recruiting minorities for faculty positions in industrial teacher education.

Programs designed specifically for preparing minorities for industrial teacher education.

METHOD, SAMPLE AND RESPONSE DATA

To obtain the data reported in this report, a questionnaire was developed and mailed to industrial education departmental chairpersons at 134 colleges and universities. One hundred and eight (81%) of the institutions, representing 1845 full time-faculty members responded.

RESULTS

1. Full-time minority faculty members

   Eighty-eight departments did not have any Black faculty members; ninety-eight (93%) did not have any Chicanos, ninety-seven (97%) did not have any Native Americans. There were no Oriental faculty members in 84% of the reporting institutions while 81% of the institutions reported no women faculty members.

2. Part-time minority faculty members

   Over 75% of the departments do not have part-time minority faculty members on their staff.

3. Undergraduate minority members

   In terms of number of minority students in the "pipeline" preparing to become teachers, the data is much more encouraging. Forty-nine departments reported having five or more minority students enrolled in programs leading to the baccalaureate degree.

   Eighty-one departments (78%) do not have any Oriental students majoring in teaching; seventy-seven (77%) do not have any Native Americans; sixty-eight (65%) do not have any Chicanos. Women and Blacks fare better with 45 department reporting "no women" undergraduate student while 25 departments reported no Blacks.

4. Graduate minority students

   A better indication of what's in the pipeline leading to teacher education careers is the number of graduate student currently enrolled in advanced degree programs. Substantial numbers are enrolled in masters degree programs with Blacks outnumbering all other minority groups. Twenty-six departments reported having five or more

Blacks enrolled in masters degree programs. Women are second in numbers enrolled with Orientals and Chicanos close behind.

5. Special Programs or Projects for Preparing Minorities for Teacher Education

Only six colleges and universities are involved in special projects or programs designed for preparing minorities as teacher educators. These include: University of Pittsburg, Oklahoma State University Ohio State University, Keane State, New Jersey, and the University of Minnesota.

6. Future Plans

What plans do colleges and universities have for providing programs designed specifically for increasing the number of minority faculty members in industrial education. Only 12 institutions (11%) indicated that they are considering plans for future implementation.

7. Minority applicants for university teaching positions

Have you had any minority applicants for teaching positions in industrial education during the last five years? In answering this question, 83 institutions reported having had minority applicants. Twenty-five instutitions indicated that they had no applicants.

8. Problems in recruiting minority teacher educators

Sixty-two percent of the respondents indicated that it was "lack of interest", while 54% indicated that applicants lacker proper qualifications.

CONCLUSION

The profession has not attained what civil rights leaders would consider a "proper balance". Progress is being made, but at a slow rate. The results of this study should stimulate the profession to develop new programs that will lead to an increase in the number of minorities in industrial teacher education.

[1]Minorities in this study inlcude five groups: Blacks, Chicanos (Mexican-American), Native Americans (Indians), Women and Orientals.

AIAA. T-10:45-3

A COMPARATIVE ANALYSIS OF PERSONALITY CHARACTERISTICS OF INDUSTRIAL ARTS TEACHERS IN THE UNITED STATES. Dr. George R. Herbert, assistant professor, Industrial Arts Education, Georgia Southern College, Statesboro, Georgia.

Have you ever heard the expression, "They have a 'great personality'", or "Tom's a nice guy but he has no personality"? This continual reference to the inanimate object of personality over the years has caused me to wonder just how personality and one's own effectiveness in life are related.

As educators, we are concerned with providing quality education. If one's personality is directly related to their effectiveness with people then it goes without saying that there must be a tie between personality and teaching. A recently concluded study conducted at the Virginia Polytechnic Institute and State University in Blacksburg, Virginia investigated the relationship of selected demographic variables and personality variables to industrial arts teaching. The groups under investigation were: the national group (A) of 156 American Industrial Arts Association teacher of the year recipients and the national group (B) of 163 randomly selected industrial arts teachers. The personality variables were those variables as measured by Jackson's (1974) personality Research Form (PRF).

Data collected from the population groups, as measured by the PRF and as reported on the demographic questions, were analyzed using the statistical procedures of multiple analysis of variance combined with t-tests and chi-square tests of significance. Simultaneous confidence intervals were calculated for the personality variables for both groups "A" and "B" following Morrison's (1976) Multivariate Statistical Methods.

The two nationally identified groups of industrial arts teachers were found to be different in respect to both the demographic variables and personality profiles. The AIAA award recipients tended to be older, more experienced, and had earned generally higher degree levels than did those industrial arts teachers of the randomly selected group (B). The AIAA award recipients were generally teaching in larger schools, unit laboratories, and were more satisfied with industrial arts as a profession than those of the "B" group. The group (B) of randomly selected industrial arts teachers were more often found to be teaching in smaller schools, yet similar size communities, and in general industrial arts laboratories, as well as being somewhat less satisfied with industrial arts teaching as a profession than were those of the "A" group.

In reference to the personality measures (PRF), the AIAA award recipients tended to possess a somewhat higher need for achievement and cognitive structure combined with a somewhat lower need for aggression, autonomy, and play than did those of the "B" group. These tendencies would suggest persons who would appear to be striving, accomplishing, purposeful, more precise, definite, and more meticulous than other industrial arts teachers. These persons would also appear to be less aggressive and less quarrelsome. They appear to be more generally manageable, dependent, less carefree, and less pleasure seeking than the group of randomly selected industrial arts teachers. The return rate of 71.8 percent for the AIAA award recipients as compared to only 49.1 percent for the randomly selected industrial arts teachers would suggest a stronger interest in professional activities or at least a stronger need to be involved.

The two national groups of industrial arts teachers were found to be quite different in comparison to the PRF normative group of college men. Both groups of industrial arts teachers were found to possess personality profiles which tended to suggest persons who were less rebellious, less likely to change, more manageable, conforming, precise, meticulous, and needed structure more than those of the normative group.

Furthermore, the AIAA award recipients were more reflective of persons who tended to be accomplishing, industrious, careful, sympathetic, protective, neat, systematic, and more disciplined than those of the normative group of college men. The AIAA recipients tended to be more approval seeking, socially sensitive, and generally more desirous of credit than the normative group. The industrial arts teachers of the "A" group also tended to be less reckless, impatient, impulsive, and less carefree than the college men of the normative group.

While many differences were found to exist between the groups under study, it was recommended that further research be conducted in this area to expand and validate the personality profiles for industrial arts teachers.

The underlying interrelationship existing with age differences and personality profiles may be reflective of persons who have learned, over time, to achieve success within a climate of conservatism and have therefore molded their thinking to conform with this environment. It may be that personality differences of successful teachers have been identified, regardless of academic area, or even successful men regardless of occupation. This analysis could not address these questions, but the writer remains sensitive to the possibility that people who are successful in organizations, regardless of their nature, have learned to cope with the perceived requirements for success. Through research of this type, hopefully educators will gain a truer perspective of the influencing factors effecting the personality characteristics of teachers.

SAFETY

AIAA. TH-1:15-2.

LEGAL RESPONSIBILITY TO YOUTH - LEGAL RESPONSIBILITIES TO YOU. Jerry Grover, Professor, Department of Industrial Education, Brigham Young University.

Many legal difficulties into which an Industrial Education teacher may become embroiled involves the law of torts. If a person commits a crime he has broken a law against society. If a person commits a tort he has broken a law against an individual. A tort is also described as a legal wrong committed upon the person or property of another independent of contract. This legal wrong, or tort, may be one of three things: (1) A direct invasion of some legal right of the individual, (2) The infraction of some public duty by which special damage accrues to the individual, or (3) The violation of some private obligation by which like damage accrues to the individual. Gatti, in 1972, in his book "The Teacher and the Law", has stated that a tort consists of four elements - duty, violation, cause, and injury. Liability has its roots in negligence. A teacher may be negligent and yet not liable. Negligence must be shown as the proximate cause of the injury. In determining the basic issue in reference to personal liability there are three main questions involved: (1) Did the school employee owe a duty of care towards the plaintiff? (2) Was there a failure on the part of the employee to observe such duty? (3) Was the failure the direct and proximate cause of any resulting injury?

The doctrine of the reasonably prudent man is a point of law that is important to all Industrial Education teachers. Prudence is defined as carefulness, precaution, attentiveness, and good judgement as applied to action or conduct. In the language of the law the term is commonly associated with care and diligence as contrasted with negligence. A teacher could be considered reasonable if he did or failed to do something that other teachers in like situations would do or fail to do. The degree of care expected of a teacher will also be measured in the light of the danger involved and the age and maturity level of the child. Thus, the shop teacher in a junior high school is expected to exercise greater diligence than the high school shop teacher.

Black's (1968) law dictionary defines negligence as: "The omission to do something which a reasonable man, guided by those ordinary considerations which ordinarily regulate human affairs would do, or the doing of something which a reasonable and prudent man would not do." Negligence is chiefly characterized by thoughtlessness, inattention, inadvertence, while wantonness or reasonableness is characterized by wilfulness. The doctrine of negligence rests on the duty of every person to exercise due care in his conduct toward other persons from which injury may result. Negligence may be an act of either omission or commission. Ordinarily the courts measure the question of negligence on the foreseeability of the possible injury to the pupil.

The doctrine of contributory negligence is defined in the Restatement Of The Law (1965) as: "Conduct on the part of the plaintiff which falls below the standard to which he should conform for his own protection, and legally contributing cause co-operation with the negligence of the defendant in bringing about the plaintiff's harm." The Ross v San Francisco Unified School District (1953) case cited several general points of law pertaining to contributory negligence: (1) Contributory negligence is a question of fact for a jury. (2) Only in the clearest of cases will recovery be barred on the ground

that plaintiff was contributorily negligent as a matter of law, particularly where a minor is involved. (3) In determining whether a minor has been guilty of contributory negligence as a matter of law, a much more lenient rule in favor of the minor is applied than is applied to adults. (4) Mere knowledge of existence of danger, will not necessarily bar recovery for injuries sustained by a child. (5) The doing of an act with appreciation of the degree of danger in addition to mere appreciation of the danger is necessary to establish negligence as a matter of law. The age of the student is a major factor entering any action which charges contributory negligence. The standard of care required for children is, of course, much greater than the degree of care required for adults.

Proper and thorough safety instruction in all aspects of shop safety is one of the best elements of liability protection a shop teacher can have. Safety instruction serves as a basis for teaching proper habits and attitudes in students.

Giving safety tests covering all areas of shop work is an excellent way of proving that a student understood the instructions that were given him. Erickson (1960) cites three specific reasons for giving safety tests: (1) Proves proper instruction was given on power equipment and tool manipulation. (2) Student puts in writing the safety rules of each piece of equipment. (3) Tests should be kept on file until the student has attained the age where right to sue are forfeit.

The need for Industrial Arts teachers to have a safe laboratory is evidenced in the loco parentis concept of a teacher - that is, that a teacher has parental authority while under his jurisdiction. The fact that this trust is placed in the teacher would also place a moral responsibility for the teacher to examine his educational atmosphere for possible hazards to the students and himself. There are a number of cases at law which have had specific bearing upon the placement, condition, and lack of safety guards on shop machines. It is recommended: (1) If a machine guard must be removed for any reason do not allow the use of that particular machine until the guard is restored to working condition. (2) Are all machines and equipment intended to be guarded so protected? (3) If guards are not provided, put the machine out of operation until such time as a guard is provided. (4) Notify the proper authority, in writing, of needed guards. Follow up, in writing, until such guards are provided. (5) The teacher must be certain that complete instructions are given for the proper use of guards on all machines. (6) Include questions on the safety test relative to proper use of machine guards. (7) Where possible, replace metal guards with equivalent clear plastic guards. A teacher will insure legal protection if he has a well organized and planned program in his laboratory. Ignorance of a dangerous situation might be the cause of teacher liability. Faulty maintenance or no maintenance at all on the shop machinery can lead to negligence suits.

Occupational Safety and Health Acts specifies that noise intensity in places of employment shall not exceed 94 decibels for 4 hrs./day. Allowing continuous exposure to excessive noise will cause permanent hearing loss.

Concerning eye protection the Utah Occupational Health and Safety Law specifies that eye protective glasses be worn in industrial education laboratory activities.

Rules regulating the dress of pupils have been held, in a number of court cases, to be reasonable.

AIAA. TH-3:45-7.
HOW TO COMPLY WITH OSHA REGULATIONS IN LABORATORIES. Clyde "Jack" James, Jr., assistant professor of Occupational Safety, Department of Industrial Technology, Illinois State University, Normal, Illinois.

As of December 29, 1970, OSHA became law for the United States industrial complex. Presently, seventeen states have some form of an OSHA plan enacted which may or may not extend coverage to a state's school system. Eventually, as a result of state legislation or general duty requirements, all schools will attempt to abide by the intent of OSHA standards. Major classifications (areas of concern) will include building and/or laboratory specifications, Life Safety Codes, National Fire Protection Association codes, "vertical" and "horizontal" OSHA standards, and codes from the National Institute for Occupational Safety and Health.

Building requirements would be of a general nature in that basic features are all the school personnel would consider. Fire resistance of walls, roof, doors, and flammable-materials cabinets would be considered, as well as square footage per pupil. Then such things as means of egress, overhead storage, stairs, floor loads, electrical codes, aisles, and working surfaces are of importance. Additional support areas for storage and finishing will attract a great deal of attention from OSHA as they may contain serious fire hazards, as well as, toxic substances. Finally, machines and their arrangement must be carefully scrutinized.

Buildings must meet requirements set forth in the Life Safety Codes. Basic construction requirements are covered in the Life Safety Codes and specific requirements are covered in 1910 OSHA standards. Presently, OSHA is very concerned about toxic materials which can cause serious physical problems, as well as fire potentials that cause serious physical reactions and/or death. An orderly progression of machining processes should also be evident within a laboratory situation. Guarding techniques should be accomplished in such a fashion as to allow good, proper maintenance and shield students from moving parts and pinch points.

SPECIAL NEEDS PROGRAMS

AIAA. T-9:00-4.
PREOCCUPATIONAL EDUCATION FOR SPECIAL EDUCATION STUDENTS.
Ronald D. Yuill, Industrial Arts Chairman, Madonna Bennett Home Economics Chairman, teachers, Tippecanoe Jr. High, Lafayette, Indiana.

The Tippecanoe program was designed as an alternative school program for slow and disinterested students. The students involved are classified at the EMR level and are 12 to 16 years old. The program is a 2 hour block of time aimed at providing these students with basic life survival skills and to introduce them to the vocations provided in our community for which they have the skills to compete successfully in the job market. This program is designed for both boys and girls and takes physical, mental and emotional problems into account as well as dealing with subject matter in the concrete form. The two special education teachers and their aides help with discipline and the tasks performed during the 2 hour class.

To "break down" stereotype roles and to use home resources while available, we begin our program with a unit on canning and freezing.

Exploring money management, home cleaning and repair, and the basics of the enterprise system made educational concepts a reality by the preparation and operation of our Christmas Boutique.

We were given a storeroom in the sub-basement that had not been used or cleaned in 5 years. This room was full of unused school items. The room itself needed much repair. Our first task was to safely move and relocate the items.

Painting walls, replacing ceiling tiles, patching the floor, replacing window glass, making curtains and rods, patching walls and replacing wall plugs were but a few of the tasks we performed to restore the boutique.

The students ran the boutique for 15 days of December with 5 students and a teacher working per day. During this time the other students operated a bakery. This enterprise involved production planning, producing products, packaging, pricing and delivery.

The boutique lended itself to study with math and English classes. Profit figuring, bookkeeping, money counting, etc. were discussed and completed by each student in these classes. Whenever possible activities are coordinated in this manner.

Tippecanoe Jr. High Home Economics Department was chosen as a McKnight field test site for the Hospitality and Food Service Program. We modified this course to the reading and comprehensive levels of our EMR students. After taking a field trip to McDonalds for breakfast we operated a fast food breakfast one half hour before school started each morning for 2 weeks. Students were assigned jobs after filling out job applications and being interviewed. They then practiced these jobs 2 days before we actually ran the restaurant. To follow up this experience we ran a fast food pizza restaurant at lunch for Tippi students. This was really a money maker and paid for our

program for the year.

Our family style restaurant was not an enterprise as such but instead a social learning experience. We practiced good manners, appropriate meal conversation, and etiquette during these meals. This unit was highlighted by a field trip to Henrici's Restaurant to practice and observe what we learned.

To start the McKnight Hotel Maintenance section we toured the local Howard Johnson's Motel. During this unit we studied carpet repair, hotel plumbing problems, furniture upkeep, cleaning and make-up of rooms and reviewed painting. We also looked into scheduling of rooms and workers.

To explore the woodworking area we designed, produced, tested and raced both Pine Wood Derby and Land Speed Record Assault Vehicles which are used in the World of Manufacturing by McKnight. After the race a barquet was planned, prepared and produced by the students with everyone who entered the race receiving a prize from our school principal. Prizes were furnished by McDonalds.

A big unit studied each year is life survival skills. In this unit we stress money know-how in such areas as insurance, auto purchasing, consumer purchasing, obtaining and keeping utilities and banking. Whenever possible we use community resource people and visit these agencies. Another section of this unit includes each student preparing, serving and cleaning up a meal for 4 people. The three students who eat this meal with the preparer then evaluate the meal, the group's table manners and conversation.

In the personal grooming unit we include clothes repair, personal hygiene and family relations as well as grooming in general. In grooming we study acne, hair, skin and nail care. Local beauticians are not only helpful as general resource people but also for free haircuts and trims.

To make our students more aware of the need for and functions of the local Police and Fire Departments and hospitals, we toured one of the community hospitals and also looked at people doing possible future jobs our students could hold. The city Juvenile Detective also spoke to our group. This was a very positive experience.

Mass production highlighted our study of industry and industrial vocations. These units included the areas of welding, painting, sheet metal working, woodworking, graphic arts and crafts.

All of these units we feel were successful but we learned places for some major and minor changes before using them again. We are setting up a 3 year rotation cycle type program because we have most of the students for 3 years. These educational concepts and learning activities are coordinated with the academic classroom learning teachers. When possible, based on ability, these students attend regular classes. This may be up to 4 out of 6 hours per day.

The philosophy of this program is very simple but real, "What a feeling going to class <u>not</u> expecting to fail."

AIAA. TH-3:45-4:45.

TEACHING THE TEACHERS OF EXCEPTIONAL LEARNERS. James J. Buffer, Jr., professor, Academic Faculty of Industrial Technology Education, The Ohio State University, Columbus, Ohio.

All children are SPECIAL, however, some have more need for specialized education and treatment because of the diversity of their unique social, cognitive, or neuromuscular functioning. Educational methods and procedures, instructional programs and materials, and school facilities must be modified for the purpose of individualizing programs and instruction to serve those students who have disabilities which prevent them from functioning and learning satisfactorily in normal school programs.

Recent federal legislation has provided the impetus to modify existing education practices for exceptional learners. Public Law 94-142, the Education for All Handicapped Children Act and Public Law 94-482, the Vocational Education Amendments of 1976, emphasize the need to identify and infuse educational strategies and techniques to meet the challenges of providing viable educational programs for handicapped persons. Further, the legislation demands that public education provide instructional programs which will be the least restrictive educational alternative for any school age persons suspected of having a handicap condition which may prevent them from succeeding.

Some industrial arts and vocational educators have been sensitive to the needs of special students and have endeavored to accommodate handicapped students in their classes without difficulty. However, others have experienced problems in doing so, possibly because of a lack of information relative to teaching the handicapped and/or the absence of supportive activities from other professional sectors. Of interest, however, are the increasing requests for inservice programs for staff, factual data about learners with special needs, and other information which would serve to support staff working with handicapped students.

Preservice Training

Most industrial arts and vocational educators have not received adequate professional training in special education as part of their undergraduate teacher preparation. As a result, some teachers have hesitated to accept handicapped students in their classes because of a perceived inability to adequately prepare and conduct instructional activities for exceptional students. Universities must provide regular class and internship experiences as an integral part of their undergraduate degree programs which would enable practitioners to master instructional techniques, materials, and strategies for the handicapped.

Some general objectives for preservice training are:

1. Acquire information regarding the educational and occupational functioning of handicapped persons.
2. Determine unique learner problems and strengths of those with educational handicaps.
3. Identify educational and vocational programs as they relate to students' strengths rather than to their weaknesses.
4. Select, develop, and use appropriate methods and materials to ensure and promote occupational and educational development.
5. Identify supportive groups and agencies, and plan how their services can be incorporated into student programs.
6. Provide for sequential planning, systematic development, and evaluation in the instructional program.

7. Utilize and integrate available community resources.

Inservice Training

The objectives for the inservice training of industrial arts and vocational personnel would be similar to those listed for preservice education. However, inservice training would concentrate on personnel development and helping staff make curriculum revisions and plan programs. Resource persons from universities, schools, and agencies may be utilized to present material on the pre- and vocational preparation of the handicapped. Also, the state's divisions of special and vocational education and the thirteen regional Area Learning Resource Centers should be able to provide information regarding legislative policies, funding, staffing, instructional materials for the training of handicapped learners.

Opportunities must be made for those industrial arts and vocational educators who wish to change career roles and develop an area of speciality in special education, e.g., pre-vocational evaluation, vocational counseling, or the development of instructional media. Graduate level and continuing education courses, workshops, and internships must be made available to support their career development.

Team Development

Pre- and inservice training should provide opportunities for professionals to work cooperatively in (1) evaluating social, cognitive, and neuromuscular functioning; and (2) planning, conducting, evaluating instructional activities for students with special needs. The team development process should include the following:

1. Define roles to ensure optimal professional output as well as flexibility in staff utilization.
2. Provide for efficient and effective communication among team members.
3. Provide sufficient experiences for those assuming leadership roles.
4. Develop opportunities for staff interaction in such areas as individualizing instruction, scheduling, modification of programs and equipment, and remedial instruction.
5. Develop approaches for the effective use of para-professionals.
6. Provide for team interaction within the community particularly with ancillary agencies (BVR, United Cerebral Palsy, Lion's Club) and prospective employers.

Pre- and Vocational Assessment

Special needs students entering vocational programs should have had the benefit of a pre-vocational assessment or evaluation, wherein formalized and standardized procedures were used to identify specific personal and worker traits and functional characteristics. These assessments will be especially valuable in helping to determine the most appropriate placement of individual students and will provide professional staff with information regarding remedial training needs.

Pre-vocational assessment and adjustment procedures also provide a means of improving the career awareness and social/cognitive functioning of handicapped individuals. It can focus attention on academic skills and make reading, science, and mathematics more relevant and related to the world of work. Pre-vocational activities could also focus on individual needs and help students become more aware of themselves as contributing members of society.

T-10:45-8
TEACHING INDUSTRIAL ARTS TO THE DEAF. Dennis Q. Drake, Vocational Principal, Iowa School For The Deaf, Council Bluffs, Iowa.

The Careers Center at Iowa School for the Deaf teaches basically the same industrial arts curriculum as any other progressive high school, in order to enable our students to become proficient and to become competitive with their hearing counterpart in the world of work. As you know, career education, industrial arts, vocational education, or whatever label is used in various schools, must be taught primarily the same in any situation to gear the student to the industrial process, tools, skills, work habits, and pride that goes into a qualified craftsman. We try to instill in our students the nine A.V.A. objectives to achieve quality in their education. In the guidance of a student into a particular field of training, careful consideration is given to his or her individual differences, hence, much of teaching is individualized.

First of all, remembering that our students have different losses of hearing ranging from complete deafness to that of hard-of-hearing, we must gear our teaching to the needs of each student. Some students have mutiple handicaps ranging from mild to severe. These may include poor sight, some to the severity of being declared legally blind; others with motor disabilities and various physical problems. This is not the rule however, but does occur in about ten percent of our student body.

The class load ranges from five to ten pupils on the average. This enables more individualized instruction and lends to a better working group within the shop, allowing for adequate room and time spent on machines and different processes. During the freshman year, all the students, both boys and girls, rotate every five weeks into seven different shop areas from home economics to welding. The sophomores, juniors, and seniors tend to specialize in one or two areas, but have the option to change to another shop area if they desire during the year. This may sound a little helter-skelter as far as planning goes and structure of the class, but remembering the smaller class load and the fact that all students during their freshman year have had the fundamentals and exploration of most of the offerings at our school, this type of scheduling works to the advantage of the student. We have had good success with this procedure; the students are given the responsibility of making decisions that effect them directly at present and in the future. Normally in the course of the school year there are less than six that transfer to another class.

The procedure used in the classroom is unique in teaching deaf students because many methods are employed. Because of deafness, the normal language process is hindered

almost to the point of being non-existent for the first formative years of their lives. Upon entering pre-school, as early as six months to a year old, language is started immediately and the building process begins. Pre-school however, is limited to children in the immediate area who commute daily with their parents for two hour sessions. The child who starts school at the normal age of five may have a vocabulary of only thirty or forty words as compared to that of a hearing child whose vocabulary would normally include three thousand or more words. Language and communication, the keystones of education, are taught at all times and at all levels of the school. In the Careers Center all types of visual aids are used, including mock-ups, language charts listing the terminology of the class, drawings, picture matching boards, tool charts, working models, parts boards, in addition to films, slides and demonstrations. The key to teaching deaf children in any industrial arts area is the ability of the instructor to demonstrate and explain the process so that it is understandable to each and every student. The instructor may have to repeat the material three or four times, sometimes on an individual basis, until he feels the student fully understands the process.

The deaf students' greatest needs are those of time, practice, and hands-on experience to fully master the techniques. Career education is started at Iowa School for the Deaf in kindergarten with hands-on experience. In sixth grade, career education is taught as an individual class with emphasis on role playing. Requirements and employer expectations in varying job classifications are stressed, including working conditions, tools of the trade and dress requirements, salaries, and other related information. In the junior highschool, the students start formal exposure to the skill building and productive techniques. Here crafts and general shop are taught in areas such as printing, drafting, woods, metals, automotives, plastics, leather, electricity. It is expected by the freshman year that basic skills and attitudes will have been developed to a degree that enables the student to pursue a chosen career.

AIAA. T-9:00-4

SPECIAL NEEDS LEARNERS: PREPARING TEACHERS FOR THE FUTURE. Ronald L. Koble, Associate Professor, The Pennsylvania State University, University Park, Pennsylvania.

The Education of All Handicapped Children Act (Public Law 94-142) was signed into law on November 29, 1975. By September 1, 1978, the law states, "a free appropriate public education will be available for all handicapped children between the ages of 3 and 18" and by September 1, 1980, "for all handicapped children between the ages of 3 and 21."

The types of handicaps that are included under the legislation are: mentally retarded, hard-of-hearing, deaf, orthopedically impaired, speech impaired, visually handicapped, emotionally disturbed, learning disabled, and other health impaired.

The purposes of Public Law 94-142 are (1) to guarantee the availability of education for handicapped children and young adults who require it, (2) to assure fairness in decision-making with regard to providing educational opportunities for the handicapped, (3) to assist local education agencies in providing educational programs for the handicapped by appropriating federal funds, and (4) to insure appropriate, relevant, educational programs for the handicapped through continual monitoring.

The Education of All Handicapped Children Act requires state agencies as well as local school districts to (1) guarantee each handicapped child a public education designed just for them at no cost to the child's parents or guardian, (2) assure that all handicapped children who may require special education are located, identified, and evaluated so they may be taught according to their needs, (3) guarantee, in writing, an individualized educational plan for each handicapped person, (4) guarantee parents who are not satisfied with their child's education the right to an impartial hearing, (5) assure fairness with testing and evaluation procedures, (6) guarantee that the handicapped child will be placed in the "least restrictive environment" using regular classes whenever possible, and (7) develop a training program for teachers of the handicapped.

To provide these services, the federal government is dispersing funds through each state. During 1978, the law authorized payments to each state of 5 percent of the average per-pupil expenditure in U.S. elementary and secondary schools multiplied by the number of handicapped children receiving special education in the state. In 1979, the amount increases to 10 percent; in 1980, 20 percent; in 1981, 30 percent; and in 1982, a high of 40 percent for a potential maximum authorized payment of $3.16 billion. The actual appropriation for 1976 was $100 million and that amount was doubled to $200 million for 1977.

All educators, and more specifically teachers of Industrial Arts Education, will be involved, as many are already, in implementing the Act. Industrial Arts teachers can expect to be actually involved in implementing Public Law 94-142 in these areas.

Program Development

The Act specifies that for each handicapped person, an Individualized Education Plan (IEP), approved by the child's parent or guardian, must exist and be followed.

Instruction

It is likely that students with many or all of the handicaps covered under the Act and previously cited, will need to be served in Industrial Arts classes.

Curriculum

To the maximum extent possible, it is preferable that the experiences provided for handicapped children be as similar as those conducted for non-handicapped children. This is implicit in the "least restrictive environment" clause. Nevertheless, it will be necessary to develop for some persons with handicaps, alternative educational experiences where regular curricula are inappropriate, regardless if they are provided in special classes or in regular classes.

Teacher Preparation

As previously indicated, it will be necessary for in-service teachers to participate in activities designed to permit them to maximize their roles as teachers of the handicapped. Also, students enrolled in undergraduate teacher education programs in Industrial Arts will need to become familiar with the characteristics of each handicap, become skilled in working with the handicapped, and most importantly, they will need to become skilled in creating or adapting learning activities in Industrial Arts for these special learners.

Facilities

Finally, it will be necessary, in many instances, to alter the facilities where instruction for the handicapped will take place. With mildly handicapped persons, it may not be necessary to rearrange or alter facilities at all. Also, in some instances, it will be necessary only to rearrange or alter work stations, or individual shop and laboratories where an identified handicapped person will be situated.

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American National Standard: Specifications for Making Buildings and Facilities Accessible to, and Usable by the Physically Handicapped, New York: American National Standards Institute, 1971.

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AIAA. T-9:00-3
DESCRIBING PSYCHOMOTOR ACTIVITIES IN INDIVIDUALIZED PROGRAMS FOR THE HANDICAPPED. John Shemick, Associate Professor, Division of Occupational and Vocational Studies, Pennsylvania State University, University Park, Pennsylvania.

Contrary to what some people think, the concept of mainstreaming did not materialize from nowhere, but rather it has evolved from a series of public laws. The first of these was the Smith-Fess Act of 1920 which provided vocational rehabilitation for the industrially-disabled. The most recent of these is P.L. 94-142, Education for all Handicapped Children Act of 1975.

The provisions of this law requires schools to provide for handicapped children an education in a least restrictive environment for which there must be an Individualized Education Plan (IEP). That plan must include: (1) a statement of goals and objectives, (2) a description of placement and services to be received, and (3) specifications of an evaluation plan that includes criteria for measuring outcomes and procedures which will be used to review program appropriateness. The law also specifies that the IEP be approved by a team made up of the handicapped student's teacher, parent(s), and a representative of the local school agency.

While handicapped students will be first examined by qualified specialists to determine if they can cope with activities of a program, authorities point out that industrial educators must also become involved in decisions related to admitting students into their programs. In order for teachers to participate in a meaningful way, they have to be able to analyze the activities of their programs and describe them to those "qualified specialists."

Indicators of Special Needs

Just what is the incidence of handicapped in the school population? Halloran (1978) reports:

Handicapping Condition	Incidence (% of School-Age Population)
Speech Impaired	3.5
Mentally Retarded	2.3
Learning Disabled	3.0
Emotionally Disturbed	2.0
Orthopedically Impaired	.5
Deaf	.075
Hard of Hearing	.5
Visually Handicapped	.1
Other Health Impaired	.06
	12.035

While Halloran reported on single disabilities, it should be noted that it is not uncommon for students to have several integrated handicaps. For example, Phelps and Lutz (1977) cite the case of Sara who has cerebral palsy together with visual, hearing, and speech problems which require her to wear corrective eye glasses and use a hearing aid.

Identifying Learners Special Needs

Phelps and Lutz suggest that teachers make a learner's profile which depicts graphically strengths and weaknesses in terms of the specific categories of: verbal skills, cognitive skills, perceptual skills, language skills, psychomotor-physical skills, social skills, and occupational interests. Some sources for documenting information

in making a profile are: teacher report and referral, diagnostic-prescriptive assessment, social referral agency, parent communication, work sample evaluation report and profile, medical examination, school achievement and attendance records, and visual or hearing examinations (Phelps and Lutz, p. 122).

When there is inadequate documentation evaluation, checklists may be used for making an analysis of a student's physical disabilities. Checklists are available in such sources as, It's About Time Physical Disabilities Came Out in the Open, (Davis, 1976) wherein checklists on Mobility and Manipulation are provided.

Obviously, Davis' checklists would be most helpful in gathering information which would provide a base for making decisions about the need for modification in the student's educational plan. However, instructors need to analyze their regular instructional program in order to determine the typical program activities need to be modified to order to accommodate the students' disabilities.

Analyzing Activities

Fleishman in his work on developing a taxonomy of human performance, explored a number of methods and techniques for analyzing performance. One of the systems developed was a binary decision flow diagram which identified 34 ability components. These components were grouped into six ability groups, namely: I) Perceptual-Motor Abilities, II) Abilities of Strength and Stamina, III) Fine Manipulative Abilities, IV) Gross Physical Proficiencies, V) Visual Perception, and VI) Auditory Perceptual Abilities. These groups lend themselves to a six digit SAE type coding system (Shemick, 1977) which would be extremely useful in analyzing activities in an industrial arts program. That is to say, if one follows through Fleishman's binary flow diagram, he or she will be able to identify the abilities within each ability group as they apply to the task being analyzed.

To exemplify the use of task analysis, a teacher might be informed, or he might observe, that a certain handicapped student in his class has severe problems with maintaining gross body equilibrium. The teacher might then analyze tasks and activities in his course of instruction for this ability. Conceivable, the teacher could use this information for (1) planning activities which do not require this ability or (2) select tasks which require the ability in order for the student to have opportunities to work on developing that ability to his potential.

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AIAA. P-9:00-3
INDUSTRIAL ARTS, A POSSIBLE MISSING LINK TO HELPING THE LEARNING DISABLED STUDENT. Robert E. Wenig, associate professor, Department of Industrial Education and Technology, Western Carolina University, Cullowhee, North Carolina.

Educators are constantly striving to understand the elusive perplexities of learning disabilities (LD's). The three major sources of help for LD's are: (1) developmental, (2) behavioral, and (3) academic. Several years ago the developmental concept (involving motor, auditory, visual, and language training) of remediation came charging to the forefront as the most promising method of helping the LD child. Its roots lie in the neurological development of the brain. That is, if a child neurologically does not have a proper sequential physiological development, if gaps are left in that development, or if some minimum damage has resulted from various genetic or organic dysfunction, a learning disability may result.[1]

Industrial arts is a school subject that instructs students through multisensory (developmental) experiences. John Dewey operated on the premise that by students experiencing manipulative processes they are more able to discover for themselves concrete knowledge which gives them deeper insights than otherwise possible. Two teachers, Colder and Anton[2], in their text, Techniques and Activities to Stimulate Verbal Learning, support the use of industrial arts sensorimotor activities. Hunt endorsed industrial arts activities when she stated:

> Evidence supports the theory that exploratory, manipulative behaviors of children are neurologically based and serve as a motivation for cognitive development. This is supported by Bruner, Piaget, and J. McV Hunt.[3]

However, Bryan declares that research has not supported the developmental methodology as the answer in helping LD's.[4] Others state that the traditional research model is inadequate to justly measure the extraneous conditions of the typical learning situation.[5]

Perhaps the most dramatic help for the LD children may come from a series of recent research discoveries dealing with the right and left hemispheres of the brain.[6] Each hemisphere of the brain process experiences differently. The left hemisphere controls the right side of the body and may be referred to as the traditional intellect which handles linguistic activities in a linear and sequential fashion. The right hemisphere controls the left side of the body functions and processes information as a whole with the focus upon spatial components and visual imagery. Schools primarily teach for the left hemisphere child who is usually more verbal, better at reading, and able to solve problems intellectually.

The obvious question is can providing right hemisphere (industrial arts multisensorimotor) instructional activities help those students who are experiencing learning difficulties? Isaack states that despite the faddish aspects of split brain psychology, recent findings about the head deserve the attention of human resources developers. For one thing, they provide a gauge for designing development pro-

grams, judging these programs, and improving their results.[7]

Accordingly, industrial arts educators through appropriate research could play a crucial role in determining the affects of recent split hemisphere discoveries on helping students surmount learning disabilities.

FOOTNOTES

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4. Bryan, T. H. and J. H. Bryan. Understanding Learning Disabilities. Port Washington, New York: Alfred Publishing Company, Inc., 1975.
5. Stufflebeam, D. L., et al. Educational Evaluation and Decision Making. Itasca, Illinois: F. E. Peacock Publishers, Inc., 1971.
6. Galin, D. "Educating Both Halves of the Brain," Childhood Education, 53(1), October, 1976.
7. Isaack, T. S. "What Trainers Need to Know About Both Halves of the Brain," Training Human Resources Development. January, 1978.

STATE AND LOCAL ORGANIZATIONS

AIAA. W-3:45-7
ORGANIZING A LOCAL IA ASSOCIATION. Joseph J. Bedics, teacher, Whitehall-Coplay School District, Whitehall, Pennsylvania.

Two things are vitally important in the creation of any organization. First, someone must take the initiative to get the organization off the ground. Secondly, if that person feels strongly enough about the necessity of the organization, for the good of all who would benefit from the organization the present is the best time to get things started. The Carbon-Lehigh Industrial Arts Association would not have been formed if I would have procrastinated. Waiting for the next person to start is disastrous, you must dedicate yourself to the task of forming an association. Psyche yourself up and begin now. Do not wait for the other person or it will not get done.

Out of eighty-five people who were eligible to become members of our organization, I started by getting three people to help with the initial stages of forming the association. If people offer their services, accept their help. You can not do everything yourself and will win the support of all who help with the initial stages of organization. When someone says that they will do typing, printing, phone calling or whatever accept their help.

The next thing I did was to obtain a list of names and addresses of industrial arts teachers in Carbon and Lehigh counties. I told my building principal what I was doing and he put me in touch with our Intermediate Unit. Fortunately, the man I talked to was very anxious to help. I presented him with a promotional mailing package that I designed and he mailed it to each industrial arts teacher. Included in the package was an announcement of the first meeting, statement of why I felt we needed an organization of this type and a questionnaire.

The questionnaire proved extremely valuable because it exposed the feelings of industrial arts teachers and as a needs-assessment survey it provided input for future programs. When the returns were received, there were twenty replies representing about 25% of the mailing. This is an excellent response; even to a select mailing 25% response is good.

At the first meeting we tried to formulate our basic organizational structure including election of officers and committees. A committee was formed to draft a constitution and by-laws. This was changed and approved by the general membership.

From my experience I have found that the most active committee is the fair committee. Our Industrial Arts Fair is held in May at a local mall and industrial arts students of Carbon and Lehigh counties may enter even though their teacher might not be a member of the Carbon-Lehigh Industrial Arts Association. The first and second place winners receive a free lunch at an awards luncheon. The students receive recognition and the publicity is also good for teachers and their administrators.

We have found it beneficial to mail out meeting announcements about seven to ten days before the meeting. Most people attend the meetings which are every other month so they are able to rap with other industrial arts personnel. They tour different shops and relate their own experiences, exchange ideas, and express opinions and concerns regarding equipment in the shops. Occasionally we tour various industries in the community.

To offset postage and administrative costs, dues of $5.00 per year are collected. We also cover the cost of mailings to teachers who are non-members. The reason for this is there might be a topic that a non-member would be interested in and hopefully he will join our association after this initial interest.

A problem that we have encountered is establishing communication among our officers. Keeping in contact by mail is not always possible so periodically we must make long distance telephone calls.

I hope that this information will be of value to you and leave you with the advice that if you do not personally take the initiative to start your organization it may never become a reality.

AIASAO. TH-10:45-2.

TECHNIQUES TO DEVELOPING A STATE INDUSTRIAL ARTS CONFERENCE. G. Eugene Martin, Associate Professor, Industrial Education Department, Miami University, Oxford, Ohio, and President-Elect of the Ohio Industrial Arts Association.

There are some basic identifiable techniques that should be followed when developing a state industrial arts conference. Underlying all techniques is the identification of KEY conference personnel who not only have the time to organize and conduct a state conference but who have the necessary administrative skills to perform the functions.

The number of key conference personnel varies according to the size of the state conference and the administrative structure of the state association. Generally, these key personnel include a program chairperson, registration chairperson, school exhibits manager, and commercial exhibits manager. Although the position title commonly identifies their duties and responsibilities, specific job functions may differ from one state association to another.

Parallel to identifying key personnel, a site for the state conference should also be selected. Major considerations include: availability of meeting rooms and commercial and school exhibit space; cost of using floor space and electrical facilities; availability of a loading dock, storage area, parking facilities, and food service; and adjacent hotel/motel facilities. Site selection should take place from two to six years prior to the anticipated date of the conference.

A conference theme is sometimes difficult to identify. The major consideration is to aim the program towards the level of those who are expected to be in attendance. Ideas for themes may be found in industrial arts periodicals, by determining what's happening on the local, state, and national scene, or by simply conducting a brainstorming session.

Conference presenters from both in state and out of state may be difficult to identify. A conference organizing committee must first determine the financial arrangements to be offered to the speakers. These arrangements often differ with individual speakers. Arrangements commonly include a honorarium, travel expenses, lodging, etc. A good speaker is one who commonly has spoken previously before an industrial arts group. In addition, the speaker is often in demand by other state associations and must be capable of addressing the conference theme. Conference presenters are commonly referred to as General Session and Interest Session presenters. The former indicating a presentation oriented towards the entire association membership while the latter is oriented to a special interest group.

A state industrial arts conference that is well attended is one that has been well advertised. Advertising techniques include making wide use of state association newsletters, encouraging district or regional representatives to the state association to advertise in their representative district, making wide use of local radio, television, and

newspaper media, and informing various personnel in the state including state department personnel, university faculty, and city, county, and regional supervisors.

Every good state conference has special events for those attending the conference. Examples include banquets for the entire membership, luncheons for special interest groups, breakfasts, and receptions. Each event needs to be planned for the anticipated audience. This includes selecting a menu and determining the anticipated number that will attend each event.

Finally, many state associations print a conference program booklet. These may range from the very simple that includes a one page listing of the dates and times of each program to a detailed program book with art work that may cost over a thousand dollars when the book is published. The person in charge of organizing and getting the program booklet published should first identify a reputable printer or printers and seek bids for the job to be done. This should be done at least four months in advance.

Each state conference is unique to any other state conference. This uniqueness has caused a wide variety and very successful programs in the many states. Underlying all state conferences are some basic conference planning techniques that should be followed.

STUDENT GROUPS

AIAA T 3:45-5
COLORADO STATE UNIVERSITY INDUSTRIAL ARTS CLUB ACTIVITIES Presenters: R. Anderson, G. Gloeckner, B. Smeltz - Staff, P. Headrick, K. Knox, B. Ludwig, S. Mackenzie, T. Sanders - Students

The enthusiasm for industrial sciences-arts education at Colorado State University has grown tremendously in the last three years. Enrollment has almost doubled, and participation in all aspects of the program have shown greater growth. Part of this growth can be traced to the development of an active club organization. This presentation describes some of the methods and activities used to develop the club.

One of the keys to reaching a large number of students is to provide a variety of activities. Last year two students decided to develop an 8 minute slide-tape presentation on the club. This is being presented at the AIAA-Atlanta Conference. Other parts of the program consist of a description of professional, money making, social, special programs and graduate club activities.

Some of the professional activities involving the club are participation in: 1-Supervised College Teaching-credit earned by assisting regular faculty with their classes; 2-Internships-credit and work experience in industry through a well planned learning program which is designed by department and industry personnel as well as the student; 3-Group Studies Classes-credit for student involvement in special programs such as club activities which are a part of the students planned learning experiences; and 4-Newsletter-each semester the advisor and club president develop a handout informing the students of "goings on".

One of the largest activities involving the students is the Colorado Industrial Arts Fair. The fair, in its 26th year, is sponsored by the CSU Industrial Arts Club with assistance from the faculty members within the Department of Industrial Sciences. The club uses six committees to cover all phases of the fair. Over the last several years the fair has expanded by 200 projects per year. In 1977, over 2,000 entries from Colorado junior and senior high schools filled the display floor to capacity.

A second activity is money making projects such as raffles, doing repair and clean up work for several week-ends in the spring and clean up at the stadium after games. Currently, the club is involved with conducting two Continuing Education classes to raise money. One, a Basic Woods and Crafts class, is designed to assist adults in learning basic "home shop" skills. The second is "Knowing Your Auto" which is designed to give students a better understanding of caring for and maintaining their own car. In addition to being a good way for the club to bring in money, it provides I.A. students with an excellent opportunity to "practice" teaching in a real-to-life situation. Both classes are coordinated and taught entirely by students under the auspices of a faculty member. The instructional strategy provides small group instruction. Each of the 6-8 club members has an assigned area to teach to a group of 4-6 adults. The small group technique allows the "student teachers" to instruct in less threatening situations.

A third activity is providing social events. These activities generate a feeling of comradery which is an integral part of club life. The club's social activities bring the members together to share good times. Without social activities, the club would attract fewer members. Those that did join would not experience the sense of belonging to a close knit group of friends. The club tries to provide a wide variety of activities to its members. In the past we have sponsored social events such as: potluck dinners, road rallies, swim parties, Friday afternoon clubs, picnics and ski trips.

Special programs is another activity conducted by the club. The Industrial Arts Club at C.S.U. organizes and sponsors summer programs which emphasize travel and practical education. In the summer of 1977, about twenty-five students took a trip to the Northwest to explore the lumber industry on a first hand basis. The trip covered ten states and included tours of Weyerhauser Corporation, Roseburg Lumber Company, Clear Fir Company, Simpson Company and Saint Regis Paper and Lumber facilities. After the students arrived back at Colorado State, they worked in teams to develop educational material that could be used for years to come. A book was produced that contained eighty-four pages of valuable information entitled Wood Technology of the Northwest. A 140 frame slide show was also developed.

Last summer's trip was so successful that current plans are being made for a trip to Tennessee and North Carolina to attend a one week workshop with the Powermatic Company, and to spend one week touring furniture companies in the Southeast.

These trips are valuable in many ways, but the interest and excitement developed by the club members and the interaction between faculty and students represent the real measure of the success of educational trips.

The Industrial Sciences Graduate Club at C.S.U. includes graduate students, graduate teaching assistants, and graduate assistants. The club assists its members in attaining services that help them to perform their duties more efficiently. Examples of these services are mailboxes for the graduate students and a telephone in their office. Social activities for graduate students are volleyball games and Friday afternoon clubs. In addition the club provides entertainment and aids the undergraduates in their club activities. It offers help in areas such as; opening labs on week-ends, sponsoring trips, and attending club meetings to offer guidance and support.

As you can see from the above information, the I.A. Club at C.S.U. has been an active force in developing the teacher education program within the Department of Industrial Sciences. The active support of the industrial sciences-arts advisors is another key to this success.

AIAA. TH-1:15-2.

AIASA YOUTH LEADERSHIP TRAINING - A STATE MODEL. Dennis Hirsch, state specialist, Industrial Arts, Anthony Taglavore, Samuel Ballard, Richard Bell, field specialists, Industrial Arts, Tennessee Department of Education, Nashville, Tennessee.

For many years the American Industrial Arts Student Association was a sponsored program of the AIAA. As such, not much time, effort, or money was spent to promote its organization and/or growth. This was true in Tennessee and even though the state supervisor provided as much leadership as possible, only a few dedicated teachers sponsored industrial arts clubs and even fewer chose to affiliate with the national association.

In 1974, the administration and supervision of industrial arts was transferred to the Division of Vocational-Technical Education. This transfer resulted in the hiring of three field specialists in industrial arts assisting the state specialist (supervisors). This expanded staff provided for greater on site visitation and supervision. Traditionally, the Vocational-Technical Division in Tennessee has placed great emphasis on the role of student organizations and thus one of the roles of the state's industrial arts staff was to establish a viable AIASA Program.

The first and a continuing effort of the state staff was to promote AIASA at all meetings and classroom visitations. Secondly, plans were begun to hold an AIASA Leadership Training Conference in August of 1975 for the purpose of organizing a state association and providing leadership training experiences for all interested clubs and their teachers. The conference was to be held at Camp Clements, a million dollar camp facility operated by the State Department of Education for the purpose of providing leadership development meetings for the FFA, FHA, DECA, OEA, VICA, HOSA, VAP, and VIP student organizations. The conference was planned by the state's industrial arts specialist staff and all industrial arts teachers were invited to attend with their club members. The travel expenses of the teacher were provided by the Vocational-Technical Division and the only cost to the campers for the week long conference was $13.00 for the meals (this has since gone up to $26.00).

During the conference, a constitution for the state association was drawn up and the state specialist for industrial arts was appointed as the state advisor to AIASA. The eight charter chapters attending the conference decided to promote the state association during the following year. The officers promoted the newly formed association through letter writing and personal visits to schools. In addition, the state officers met in Nashville in January to plan the second summer leadership conference.

The second year was similar to the first except that the state AIASA group set up a process to honor one AIASA member as the Outstanding AIASA Student in Tennessee. This has become an annual award since that time.

At the third summer conference the association started using the approved year's program of work technique of scheduling functions and operating on a budget. Samples of this program of work will be made available upon request to interested parties by writing the Tennessee Industrial Arts Specialist.

The key elements necessary to promote the growth of a state association, as seen by the officers and members of the Tennessee Chapter of AIASA are, 1.) an annual function such as a conference or convention and 2.) a formally approved program of work that offers activities for the membership to become involved in.

Tennessee AIASA is expanding its program to include two new major functions. The first is participation in the three major fairs in Tennessee, the Tennessee Valley Agricultural and Industrial Fair in Knoxville, the Tennessee State Fair in Nashville, and the Mid-South Fair in Memphis. This participation will include project exhibits and student demonstrations. The second expansion effort will be the conducting of AIASA competitive events in the Spring of the year. These competitions will be held once in each of the three grand divisions of Tennessee, East, Middle, and West. They will be held in conjunction with the three regional Industrial arts fairs held in Memphis, Nashville, and Knoxville. These fairs have been established in Tennessee and are usually held at one of the large indoor shopping malls. Industrial arts programs from the three regions display student work completed during the past year. The fairs and competitions will act as the culminating event of a year's effort in industrial arts and Tennessee AIASA.

Tennessee AIASA is moving in the right direction. We have grown from eight chartered chapters to a total of twenty-two, eighteen of which have remained on the active list. There is however, a potential of over 400 chapters, so there is much work left to be done.

TEACHER EDUCATION

AIAA T- 10:45 - 9

MATERIALS: A PROGRAM FOR FUTURE INDUSTRIAL ARTS TEACHERS

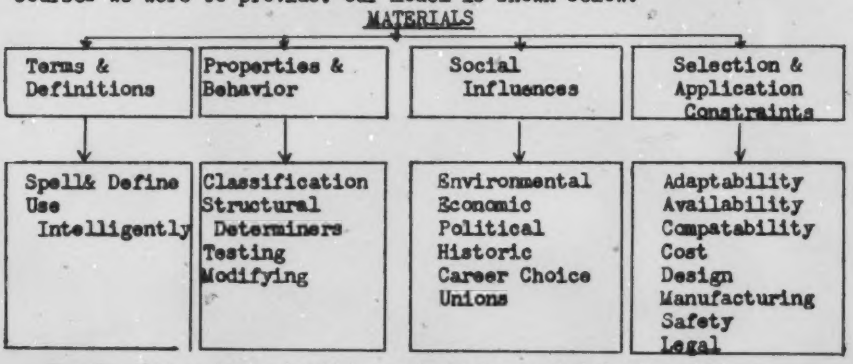
Joseph E. Carpenter, Associate Professor, Industrial Technology Department, Fitchburg State College, Fitchburg, Massachusetts.

Educators are constantly endeavoring to arrange subject matter to provide for new material, and to increase efficiency in the education of students. In this philosophical labor, some success has been realized, however, the elusive goal of perfection has not yet been achieved. The field of Industrial Arts teacher education has had many such innovative plans, some relatively obscure, others put forth with great fanfare. We, at Fitchburg State College, are confident that we can contribute significantly to the attainment of our ultimate goal- the preparation of graduates who are better prepared to teach Industrial Arts in our changing society.

Several years ago the I. A. faculty at Fitchburg State initiated a study of its program, with the intention of retaining the best features and incorporating new ideas. We have developed a program, based on four Thematic areas of instruction, Communication, Energy, Transformation and Materials. I do not plan to expound on the entire program, but to limit my remarks to the Materials section.

The Materials Committee worked diligently on the problem before us- given students of the same ability as previous classes, no increase in the total time to educate them, a rapidly expanding technology - how can we best arrange our program so that we can do a more efficient job, remain flexible, provide for future expansion and graduate a potential teacher with the finest education possible?

Our definition of the term - "Materials - matter in natural or synthetic form, consisting of elements or their aggregates, and selected by Man for his use" - indicated the scope of our area and the model we prepared provided the basic framework for content of the courses we were to provide. Our model is shown below.


MATERIALS
Terms & Definitions
Properties & Behavior
Social Influences
Selection & Application Constraints
Spell& Define Use Intelligently
Classification Structural Determiners Testing Modifying
Environmental Economic Political Historic Career Choice Unions
Adaptability Availability Compatability Cost Design Manufacturing Safety Legal

The Committee determined what should be included if a student were to major in Materials and what our role should be as a support area for the other three Thematic areas in our program. Working in close cooperation with other committees, it was decided that three levels of courses were needed:

FIRST LEVEL -one introductory course, required of all entering students, to provide a solid base for future decisions in the selection of the student's major area of concentration.

SECOND LEVEL - for students who select Materials as a major (along with one other Thematic area) - three required courses:

1. "Fundamentals of Materials" - a study of the properties of materials, and how these are determined by molecular bonding, atomic structure, heat treatment, mechanical working or machining.
2. "Development of Industrial Materials" - a study of procedures for converting raw materials into semi-finished products, with consideration given to the properties developed as a result of the process utilized.
3. "Service Requirements of Materials" - a study of the problems concerning the environmental effects on the properties and behavior of materials and of the procedures or modifications which can be used to minimize these effects. and environmental influences.

These are all three semester hour courses, utilizing the laboratory for practical experiences.

THIRD LEVEL - for those who desire a concentration in Materials, 15 S. H. of elective courses selected from offerings in this area, to meet the student's needs and desires.

Presently, in the State of Massachusetts, there are few public schools which have Materials Laboratories, most are of the traditional Unit or General Shop types. We do not anticipate a rapid introduction of Materials laboratories or courses, therefore, to be practical, we do not encourage students to select Materials as their major area of concentration. Our present efforts are directed toward the education of our students in those areas that may lend themselves to easy incorporation into existing programs. As our graduates replace present faculty members in teaching positions, we anticipate that they will gradually introduce some phases of their Materials education into these older programs, eventually creating a need for students with a major in Materials. This will be a gradual transition, but one that we look forward to with a great deal of confidence and expectation.

As a support to our other Thematic areas, courses such as Heat Treatment of Metals, Metallurgy, Plastics Technology, Strength of Materials and others for which our laboratory may be best suited, are offered. Future Materials majors would also be students in such courses at such time as we were to expand our program to accomodate such majors.

During the past several years we have become increasingly aware of the finite availability of many materials that we once thought of as being limitless. This has resulted in an increase of interest in the research into recycling and reuse of expended materials. This appears to be an instructional area which traditional programs may have some difficulty in covering. Materials study can provide this opportunity very adequately.

In the continual search for a viable method for the economical and adequate education of Industrial Arts teachers, trained for existing and future teaching positions, we at Fitchburg State College consider that our Materials program is well on its way to providing an excellent foundation, as well as being an outstanding support for our other Thematic areas of Communication, Energy and Transformation. However, no static curriculum can keep up to date, so we are continually reviewing, making minor changes, introducing new courses and trying to improve as we go along.

ACIATE T-7:00-5

COMPETENCY BASED TEACHER EDUCATION. Franzie L. Loepp, associate professor, Department of Industrial Technology, Illinois State University, Normal, Illinois.

According to Wright, "Competency-based education is a system of education designed to develop pre-specified, role-relevant competencies in those who are products of the system."[1] During the 70's an educational trend representing this type of orientation began to permeate teacher education programs throughout the nation.[2,3,4] This movement clearly suggests a number of changes in faculty and student roles.

The role of the faculty became that of a "manager" of the learning process. In this role, planning various kinds of learning activities becomes a major function. In most programs a number of activities are developed to accomodate a self-paced individualized mode of learning. This has resulted in a proliferation of a variety of new materials for teacher education.

Most of these materials were developed and used in local programs with little or no intent for mass distribution. Quality is quite varied. Many feature individualized components and some include multi-media software. In addition, a number of funded projects also developed materials-many of a rather high quality.[5] This has definitely aided faculty with the planning function.

Organizing became the second managing function. Faculty spent far more time interacting with their colleagues, conducting surveys and follow-up studies, validating competencies and using this in-put to develop a systematic program for their students.

The other major managing function is one of controlling. This involves activities such as diagnosing a student's problem and then guiding him to the appropriate learning activity. It also involves an increased amount of recordkeeping as students progress through the program. While faculty find themselves planning, organizing, and controlling, the student's role is

[1]Wright, Larry S., "Foundations of Competency-Based Education," in Competency Based Industrial Arts Teacher Education, ed. by Brueckman and Brooks, (Bloomington, Illinois: McKnight, 1977), 37.

[2]Brueckman, Jack C. and Brooks, Stanley E., Competency-Based Industrial Arts Teacher Education, (Bloomington, Illinois: McKnight, 1977), 105-6 and 268.

[3]Hall, Gene E. and Jones, Howard L., Competency-Based Education: A A Process for Improvement of Education, (Englewood Cliffs, New Jersey: Prentice-Hall, 1976), 206-331.

[4]Norton, Robert E., et al. Performance-Based Teacher Education: The State of the Art, (Columbus, Ohio: The Ohio State University Press, 1976), 71-100.

[5] Ibid.

also changed.

Typically, students have extensive experience in a more passive system while CBTE requires them to be more accountable and to perform many tasks. Thus students often perceive CBTE as a more demanding mode of education. They tend to express a feeling of being overworked. Further many are unable to discipline themselves to progress at a normal rate in a self-paced system. On the other hand students find they can work together to attain the objectives. They also express an appreciation for being able to take tests at their convenience rather than according to an instructor's schedule.

Although CBTE may not impact the entire teacher education field, it certainly will continue to be an influence. For example, even in traditional programs, faculty are more concerned about validating the curricula. The use of performance objectives is becoming more extensive. And efforts are made to place the student in a more active role.

Whether the trend toward CBTE increases, stablizes or diminishes, it is clear that CBTE has had and will continue to influence industrial arts teacher education. In the opinion of this writer this influence has and will help to improve the quality of teachers entering the profession.

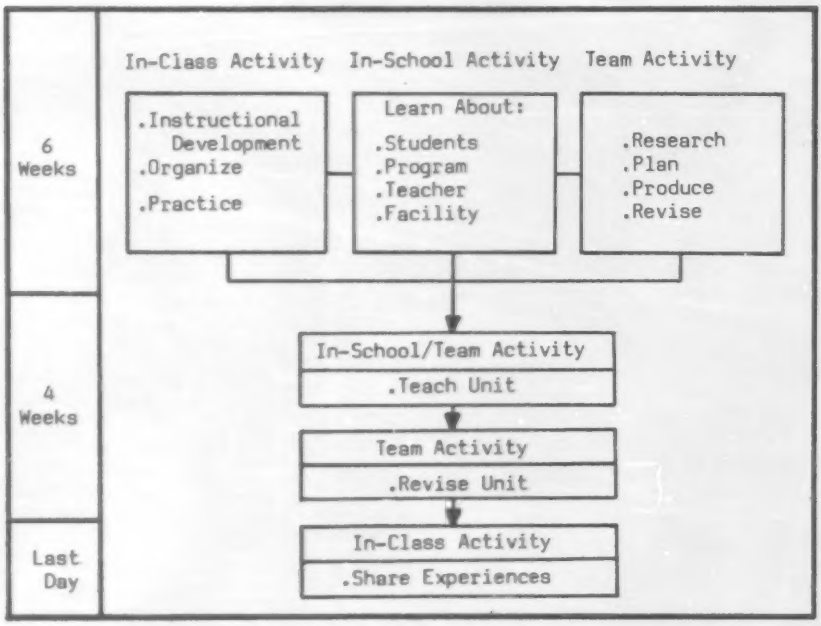
AIAA. W-3:45-1.

A PROGRAM THAT PROVIDES SCHOOL-BASED EXPERIENCES IN INDUSTRIAL TEACHER EDUCATION. Richard Barella and Richard Henak, Department of Industrial Education and Technology, Ball State University, Muncie, Indiana.

Systematic planning of our department's professional industrial teacher education course sequence has been an on-going process for the past several years. Our present three course articulated sequence which includes school-based experiences will be augmented in the near future by one and possibly two new professional courses which will also include an expanded reality-exposure dimension.

In the present sequence, the first two professional courses provide students with functional knowledge and skills related to curriculum and instructional development. The activities in these courses are primarily campus-based although directed observations and involvement with public school students and teachers are an integral part of both. The third course in the sequence is designed to be a synthesis of the two earlier courses. In this course students bring together and apply what they have learned in the first two courses. This team taught course is sequenced as shown in the model below.

COURSE SEQUENCE



The students work in teams of two or three in order to develop five to ten day units of instruction which are implemented in public schools. During the first six weeks of the course students engage in three major types of activities which take place concurrently

after the first few class sessions. In-class activities on campus include instructor presentations and student activities designed to reinforce and expand upon concepts and practices introduced in the two previous courses. Furthermore, each instructor works with five or six teams and assists them in identifying unit topics, grade levels, schools, and cooperating teachers. With these decisions made the teams become involved in a series of planned in-school activities. Cooperating teachers work closely with the student teams so they are able to characterize their learners; determine how their units will fit into the existing programs; determine the facilities, equipment, and materials they will need; and become familiar with school and laboratory policies and procedures. A third type of activity involves the teams in researching, planning, and producing written units according to criteria specified in advance. Evaluation is provided by the instructors via written comments, conferences with each team, and by students in class after each team presents a "trial run." The trial run is a simulated teaching activity in which students select one day's lesson to try out on their peers. The various kinds of evaluative feedback received by each team helps them to make revisions which result in a second unit draft. It is this second unit plan that the teams implement with the public school students.

Four weeks of the course are devoted to the actual teaching of the units and a final revision which is prepared after the teams conclude their teaching experience. These third unit drafts are evaluated by the course instructors.

A rewarding activity for both students and instructors takes place during the final class session of each quarter. It is at this time that students share their experiences and offer suggested improvements.

These discussions invariably reveal that students strongly favor the blending of theory and practice. They feel that the content and activities of professional courses is illuminated by their experiences in the public schools. Thus, they highly recommend more and earlier school-based experiences. As a result we have recently formed an advisory committee consisting of public school administrators, supervisors, teachers, undergraduate students, and university instructors to explore the alternatives to expanding the school-university coalition. Current trends in teacher education place much emphasis on involving public school personnel in the development and implementation of preservice professional programs.[1] It is our belief that this cooperative effort will provide greater benefits for our teacher trainees as well as the public school industrial education teachers and students involved.

[1]Mays, Robert E. "The Gap Between Theory and Practice Narrows." Hoosier Schoolmaster, Winter, 1977.

AIAA. TH-2:30-4.
INSERVICE FOR THE INDUSTRIAL EDUCATION TEACHER.
C. Victor Larson, Supervisor, Department of Industrial Education
Omaha Public Schools, Omaha, Nebraska.

Many inservice programs are virtually useless. Often the program involves a day or two of preschool sessions devoted to welcome speeches and some planning for the opening of school. Or there is a Professional Day consisting of general sessions with school music groups and a lecture followed in the afternoon by small-group meetings and shoptalk.

Beginning teachers are seldom adequately prepared for the "real" world of teaching. The experienced teacher has the problem of keeping up with new developments which tend to outrun his/her techniques and outdate his/her curriculum. It is my contention that meaningful and well-planned inservice programs become the primary vehicle by which schools and individual teachers are moved from yesterday into tomorrow. Inservice programs should be based on staff experience, the community, a predetermined need and other such factors. The prime goal must be to promote the continuous growth of the teachers with the overriding factor of what will ultimately benefit the student most.

Inservice programs need to be developed and maintained in such a fashion that the continual progress is recognized by the various components of the instructional team. Careful planning must precede implementation. While each program will, of necessity, be tailored to the local situation, it will, in most cases, have the three dimensions described below.

The first dimension is concerned with professional growth. From preservice to professional maturity the teacher is learning certain competences and achieving certain goals. The second dimension is knowledge (the content of the program). Unless the program has something to offer from the specific field to stimulate the teacher, it is not likely to be a balanced program. The third dimension that must be looked at is motivation. Teachers must constantly keep themselves informed of new knowledge, the modification of methods, and new insights produced by research and development. Therefore, the person responsible for inservice programs in a given school district must be familiar with the above mentioned dimensions.

The Industrial Education Department of the Omaha Public Schools believes very strongly in meaningful and well-planned inservice activities and have tried to offer programs relevant to our many areas of study. I became interested in, and saw the importance of, inservice while I was a secondary teacher in Omaha and pursued this interest through graduate work and as a curriculum supervisor. I feel very strongly that inservice education is needed by all teachers, especially those involved in the technical field, such as industrial education because of the rapid technological changes that are taking place.

The inservice philosophy our department adheres to in the Omaha Public Schools is to provide meaningful learning experiences for classroom teachers so they can take these experiences directly back to their classroom/laboratory and put them to use. One of our major objectives is to lecture very little during the activity. The second

objective is to provide "hands-on" experiences in each of our activities. It is my opinion that these two objectives have contributed greatly to the success of our programs.

Nothing seems simple in education anymore; however, it is my contention that meaningful inservice programs can be offered with a minimal amount of logistical mechanics. We simply assess the needs, plan the activity (with teachers), conduct the activity, and evaluate the activity.

During the past five years we have operated the following inservice programs for our teachers: Architectural rendering techniques, welding (two activities), graphic arts paste-up, graphic arts in the junior high, cutting tools and abrasives, residential framing, concrete and masonry, drywalling, painting and decorating, metric education, solar energy, first aid used in industrial education, machine maintenance, and a field trip through industry each month. All activities have one common objective, "hands-on" practical experience. The following is an example of our residential framing activity which is typical of the other programs - a local residential contractor provided a job foreman and blue line prints for a speculative house to be framed. Six of our teachers involved in the program were paid wages and worked after school and on Saturday for three weeks until the house was framed. Each teacher worked approximately 70 hours and received invaluable hands-on learning experiences. They also received professional growth points which are needed by each teacher employed by the Omaha Public Schools. In fact, upon successful completion of all our activities, each teacher can receive a predetermined number of growth points.

The teacher response to our activities has been excellent in my opinion, as approximately 80% of the 104 industrial education teachers have participated during the past five years. These programs are all voluntary and the teachers are under no obligation to attend. We are very proud of our program in Omaha and plan to continue placing major emphasis on inservice education in the years to come.

TEACHING AIDS

AIAA W-3:45-8
WHY ADVISORY COMMITTEES? Joseph J. Cecere, instructor, Department of Industry and Technology, East Texas State University, Commerce, Texas.

In the next ten years we will have over thirty-four-million people joining the labor force. These people will be making highly personal and important career decisions regarding their lives and even their families. How a person arrives at the career decision can mean the difference between a professional fullfillment or a long series of sour work experiences leading to "job hopping" and unemployment. The choice of the right profession depends in part on the information which the student receives in school. For many of these people success is placed in a large degree in the hands of the educators. That is the schools, teachers, guidance counselors, etc. It is our responsibility to do this successfully.

One of our best tools which is available to us today is an advisory committee. The time has come when education needs the cooperation between business, industry, labor, government at all levels to help provide that education that is needed.

Bringing out some of the advantages that can be seen in advisory committees include:

...Advisory people can inform teachers, counselors and schools of jobs that are needed and what type of training that might be needed.

...To help update programs so that the students learn what is important to qualify them for those jobs.

...Could be used as a supporting factor in getting new ideas, or programs accepted. Administration could be better pursuaded to accept the changes.

...The knowledge that these advisory committees have about their fields today is vitally important. By utilizing their skills, teachers could be brought up to date on what is taking place. Learn new techniques and brush up on old ones.

...Acting as an outsider, this advisory committee could possibly see different areas that could improve the program but are overlooked. Sometimes we see that area in one perspective only and if another one is brought in, other areas would be clarified.

...Assisting in funds and equipment. By utilizing these people, it is possible that funds could more easily become available within the school system or from outside. Also equipment may be donated to the program from companies through the help of the advisory committee. So we can see there are great benefits to an advisory committee. In the system of accountability, these people can help us in heading in the right direction. We must start taking advantage of this source of help. If not, it is possible that our programs could become primitive and finally be omitted. Education has seen the importance of industrial arts educatio and is working to involve the program more and more with general education. We must help in reaching that goal. The Advisory Committee is one big step.

AIAA Special Interest T 7:00-3

EGG DROP-A WINNER FOR EVERYONE. Gary Henderson, Drafting Instructor, Department of Industrial Education, Lamphere High School, Madison Heights, Michigan.

You probably are wondering two things. What is Egg Drop, and Why is it a winner to everyone?

To answer what an Egg Drop is -- students must design a container to protect a fresh egg from breaking during a fall of 85 feet -- hence an Egg Drop.

Why is it a winner for everyone? For many reasons. First it allows students to put to practical use what they have learned in surface development units in drafting courses. Secondly, it involves the rest of the school -- administrators as well as the student body. Last but by far from least, it involves the entire community: Fire Department, newspapers, television stations, parents, people from the community as well as strangers.

How did all this happen? I needed something to keep my drafting students interested in their work the last few weeks of school. I teach advanced drafting and we have a unit in each drafting course in surface developments and intersections but as in most cases the learning is never put to a practical test: thus the Egg Drop Contest.

This year will be the 7th Annual Egg Drop Contest at Lamphere High School.

The students are asked to design a container for the egg that must include at least 1 of each of the following surface developments: parallel development, radial development, transitional development and an intersection.

Each student designs his or her container and has it approved by me to make sure it meets all the requirements. They are then given the required paper so as to build their containers and are given a fresh egg on the morning of the drop to place in their container.

This is where the rest of the school enters. Your administration will help select the time of day to hold the contest. We held our contest during second hour the first 3 years, but so many students skipped out of class to see it that we now hold it during the last hour of the day. Now the community comes into the picture. We send out news releases to radio, television and newspapers. This will be the fourth year all three TV stations in Detroit (TV2-WJBK, TV4-WWJ and WXYZ) will be out to cover the contest.

The City of Madison Heights purchased a new fire truck that has a snorkel ladder with a basket that goes 85 feet in the air, this is what we drop from.

The material used to build the egg containers and the amount used were covered. Complete details about designing and the building of egg containers were discussed and questions answered.

On display for viewing were pictures of an actual egg drop and egg containers before the drop, materials used in construction and some egg containers were also on display.

The complete history (7 years) of the egg drop was discussed and the changes and variations used were presented. The interest shown by students, administrators (High School and Central Office) and parents was presented as was how this activity will sell your program.

TEACHING METHODS

ACESIA TH 3:45-12

SPECIAL INTEREST SESSIONS. Topic: Hands-On Workshop 3:45-5:00 p.m. Hermitage-West. Harold G. Gilbert, professor, Coordinator for ACESIA program. Department of Industry & Technology, Northern Illinois University, DeKalb, Illinois, 60115.

Hosts

Dick Peterson
West Virginia University
2929 University Avenue
Morgantown, West Virginia 26506

Leon T. Harney
East Texas State University
P.O. Box 3063
Commerce, Texas 75428

The following presenters provide the tools, materials and ideas for participants to roll up their sleeves and try the suggested activities:

1. Ronald G. Barker, instructor
   Western Illinois University
   Macomb, Illinois 61455
   Topic: Community Helpers: An Integrative Classroom Activity

2. Dr. Eldon Rebhorn, Assoc. Prof.
   Industrial Arts Education
   Indiana State University
   Terre Haute, Indiana 47809
   Topic: Batch Production: Tic-Tac-Toe

3. Professor Leon T. Harney
   Department of Industry & Technology
   East Texas University
   Commerce, Texas 75428
   Topic: Decorating Leather with Glad Rags

4. Joe Thomas, Elementary Career Guidance Instructor
   Central High School
   Thomasville, Georgia 31792
   Topic: Activity Based Career Education for Elementary Students

5. Dr. Charles H. Wentz, Associate Professor
   Industrial Arts Education
   University of West Florida
   Pensacola, Florida 32504
   Topic: Shell-Flower Plaque

6. William R. Erwin, Jr.
   School of Industrial Technology
   University of Northern Colorado
   Greeley, Colorado 80639

7. Carroll A. Osborn
   Industrial Education Department
   Eastern Michigan University
   Upsilanti, Michigan 48197

SYMBOLIC INTERPRETATION THROUGH LABORATORY EXPERIENCES. Vincent J. Walencik, Assistant Professor, Department of Industrial Education and Technology, Montclair State College, Upper Montclair, New Jersey and Gloria Amatrudi, Reading Specialist, Montclair Public Schools, Montclair, New Jersey.

The Challenge

> ...white matter is arranged in tracts (bundles of axons); ascending projections tract transmits impulses upward; descending projection tract transmits impulses downward; associations tracts transmit from one convolution to another in the same hemisphere...

Are you able to comprehend the above passage? Do you understand the vocabulary used in the text? Well, if you are having difficulty here's the answer: The passage describes how a major part of the body's nervous system functions, the brain. Just as the uninitiated adult finds the above paragraph unintelligible and, therefore, confusing, a tenth grader may be apt to experience similar feelings when first encountering the following set of directions:

> Select a sharp, correctly ground tool. The inclusive angle of the point of the tool should be 60°, with each cutting edge having the same degree of angularity. An end relief of 8° to 10° and a side relief of 8° to 10°. No side rake is required.*

As can be seen, industrial arts has its own "language" and related concepts, which students need to comprehend if they are to function in the laboratory successfully. Many teachers believe that students know the vocabulary of the discipline because the pupils perform adequately on both practical and written exercises. The following test illustrates that vocabulary comprehension need not exist to pass tests (or complete projects):

Procedure: Read the following sentence and answer the questions that pertain to it.

The flumy flutzels fuppled fursily in the furvish fud.

a. What kind of flutzels were they?_____
b. What did the flutzels do?_____
c. Where did they do it?_____
d. What kind of fud did they fupple in?_____

Follow up Questions:

1. Did you answer the above questions correctly?
2. Do you know what a flutzel really is?
3. Did the questions measure reading comprehension?
4. Are they like any questions you ask in school or in workbooks?

Moral: A student can answer all the questions correctly and yet not understand what he has read because he did not understand the words of the basic concepts presented.

The Opportunity

Industrial arts is afforded the opportunity to aid students improve their reading skills due to a number of factors. Students with reading difficulties often tend to gravitate to disciplines where reading is not stressed. Another factor is that students are usually interested in industrial arts activities. Finally, industrial arts has a definite advantage not available to reading specialists -- the simultaneous use of the many senses during learning activities. Educational theorists agree that the more senses involved the easier it is to learn and retain that knowledge. The following suggestions are offered to industrial arts as practical methods in which she or he may with a

*The text from which this passage was taken has an estimated readability level of grade 10 when subjected to the Fry Index of Readability.

minimum of preparation and loss of laboratory time actually experience improvement in reading abilities of their students.

1. Name That Part. This activity is designed primarily for elementary and middle school grade levels and functions as an introduction to machine usage. The activity should preceed any formal lesson by the teacher. The teacher prints two sets of name cards. Each card identifies a particular part of a machine. The class is divided into two groups. Each group is given a set of the name cards and a roll of tape. The pupils are asked to fasten the name card to the corresponding part on the machine. The first group to correctly complete the assignment is the winner. Since no detailed introduction is provided the students are forced to search out other sources of information (books, charts, etc.).
2. Procedure Sheets. In many cases students have no need to refer to the procedure sheets because the instructor has demonstrated the required steps and processes. The limited use of the procedure sheet is illustrated by the rare moments one finds a student working with a procedure sheet by his or her side. It is more convenient for the pupil to ask the instructor "What do I do next?" The student knows that the teacher will give her the answer. The teacher can help the pupil read by 1) requiring procedure sheets at each work station, 2) having pupils refer to procedure sheets whenever their questions relate to processes or steps and 3) do not demonstrate all processes detailed on the procedure sheets (let students apply knowledge to determine and improve comprehension skills).
3. Toss-Up Homonyms. Homonyms are words that sound the same but have different meanings. The spelling may be the same or different. The industrial arts use many of these terms. Students may be familiar with everyday usage but industrial arts adds a new dimension. Some industrial arts homonyms are apron, awl, pilot, saw, rip, carriage, dog, vise, board, ash, etc. There are literally hundreds of these words. In this game the instructor "tosses-up" a homonym and the class must give a "technical" meaning of the word, an everyday meaning of the word and the spelling of the word.
4. Thing-Stuff Rack. Students frequently ask, "Can I have the stuff to put on my thing?" After hearing this request the teacher directs the student to a rack containing some "stuff" and some "things". The objective is to have students use correct names or terminologies. No request is granted until the student uses the acceptable names or terms of the item referred to. This activity also forces the teacher to use proper terminology and to eliminate such ambiguities as "this", "that", etc.

The above suggestions represent only a limited number of activities which the industrial arts teacher can employ to aid his pupils. Implementation of these techniques will be rewarding to the teacher as well as students. The students will find them enjoyable and the teacher will have the satisfaction of helping his pupils develop skills not usually associated with industrial arts. The most impressive element is that pupils do not perceive that they are undertaking reading activities while, in fact, they are unconsciously improving these skills.

The authors wish to thank the graduate students of the Department of Industrial Education and Technology, Montclair State College who participated in this study.

AIAA T 9:00-2
CONCEPTS OR CLUSTERS IN SELECTING CONTENT
M. JAMES BENSEN, UNIVERSITY OF WISCONSIN-STOUT

The term "cluster" has taken on a significant amount of popularity in industrial arts curriculum development during the past few years. Many elements have contributed to this movement including the national support of career education and traditional programs which continue to draw their content from the trades.

The cluster approach has proven to be a convenient content organizer. It is, however, considerably lacking in preciseness and internal consistency, which are so important in curriculum design and this eventual learning on the part of the student.

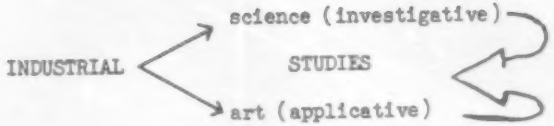
A conceptual approach is far superior to clusters when matched up on such criteria as cognition, transfer of learning, content stability and in the "process as content" issue. It should be emphasized that learning in industrial arts, whether "clustered or conceptual", should be experiential. Students should also engage in activities which are relevant and which reflect the current state-of-the-art.

Many contemporary programs are basing their content on the study of industry, technology, or a combination of these two fields. It is important when programs are developed in these areas that the terms be thought of in their "singular" rather than "plural" tense. If examined from the singular dimension, they take on a conceptual framework and the universals are taught.

If industry and technology are examined from the plural tense, they fall into the "cluster" category; hence, present shortcomings in curriculum design.

Singular (concepts)		Plural (clusters)	
INDUSTRY	TECHNOLOGY	INDUSTRIES	TECHNOLOGIES
- finance	- ideation	- transportation	- communication
- marketing	- modeling	- publishing	- production
- production	- computing	- service	- transportation
- research and development	- managing	- production	- laser
- service	- problem solving	- etc.	- etc.
- etc.	- etc.		

The educational orientation that one would study either industry or technology is equally important in determining and accomplishing specified outcomes. We have a history of studying industrial arts (applications). In comparison, we have a fairly modest attempt of studying industrial science (investigative). If one chooses to study industry in a more balanced perspective, we would include both an art/science dimension, and the study would reflect the following:



If we choose technology as our content base, we have to be equally perceptive in establishing an educational perspective. When we examine technology education in a two dimensional matrix of a science/art perspective, and from a particular educational orientation, we identify some interesting rubrics for discussion:

		TECHNOLOGY EDUCATION PERSPECTIVE	
		ART BASED	SCIENCE BASED
EDUCATIONAL ORIENTATION	Procedural Instruction	- read prints - follow plans - assemble kits - make things - etc.	- cook book experiments - imitate demonstrations - follow procedures - etc.
	Creative Problem Solving	- design & development - aesthetics - models - prototypes - etc.	- research and experimentation - engineering problems - Rube Goldberg apparatus - etc.

If the outcome of our educational process is to prepare people to live a self-fulfilling life and be a contributing member in our society, we have to prepare them to deal with both the social institution of industry and the dominant knowledge base of technology. To do this in our rapidly changing times will require a truly well thought out, balanced curriculum for our profession.

AIAA. T-3:45-2.

SHOP/LABORATORY MANAGEMENT. William E. McKell, Professor, Department of Industrial Education, Brigham Young University.

Problems that arise for both beginning and experienced teachers are usually related to the lack of organization and management rather than from a lack of technical skills. If industrial arts teachers can anticipate some of these problems ahead of time the school year will be more enjoyable to the teacher and more interesting to the students.

A recent study by Wright (1975) found that when industrial education teachers were asked to identify the most common problems they faced in the daily operation and management of an industrial education shop or laboratory the following topics were representative of problems in the various curriculum areas: (1) controlling discipline, (2) safety policies and procedures, (3) budgeting for instructional supplies, (4) purchasing supplies, (5) handling student monies, (6) selecting and purchasing tools and equipment, and (7) using student personnel systems. The Utah Administrative and Management Guide for Industrial Education teachers recently written by McKell (1976) for the State Board of Education under the direction of Joe O. Luke, State Specialist for Industrial Arts, gives some direction to the solution of problems faced daily by industrial arts teachers.

"The purpose and function of management activity is to enable the industrial education teacher to carry on its activity smoothly, effectively and economically" (Ray 1972). The management functions of planning, organizing, directing and controlling, recognized in industry for many years but, for the most part, have not been identified by industrial education teachers, as related to a study of the processes, materials, and problems of industry.

SAMPLE POLICIES AND RULES

1. Leaving the class area to go to work in the shop
   a. Shop foreman will give signal to go to work
   b. The speed limit is 2 miles per hour (normal walking speed) Do not exceed this limit
   c. Eye protection must be worn at all times
   d. Anyone finding you not wearing safety glasses can have you do his clean-up duties
2. Working in the shop
   a. The shop is a place to work - if not working you should be planning your work in the class area
   b. Do not play with machines or tools. If you think of a new way to use a tool, check with the instructor
   c. Share tools and be courteous to each other
   d. You are not a horse, so don't "horse around" in the shop
   e. Follow safety rules; you may be able to save a serious eye injury
3. Cleaning the shop or laboratory
   a. Stop work when "clean-up" is called
   b. When shop is clean and tools are returned to their proper places you will be dismissed.

LEVELS OF RESPONSIBILITY FOR A SAFETY PROGRAM

District
   1. Overall direction - policies
   2. Support of delegated authority
   3. Logistical support for facilities and equipment

School Principal
1. Staff assignments to support district policies
2. Acquisition of equipment and supplies
3. Suspension of students who are a hazard to themselves and others

Teacher
1. Implement safety procedures
2. Teach safety concepts, attitudes and practices
3. Enforce safe practices
4. Report unsafe conditions and accidents
5. Make safety reports and inspections

Students
1. Follow safety rules and regulations
2. Help maintain safety atmosphere in shop

100 PERCENT EYE SAFETY PROGRAM

Procedures
1. Set school policy for 100 percent eye safety
   a. Acceptable types for school
   b. When to be worn
2. Provide direction for student acquisition
   a. Student purchase from own source
   b. School bookstore sell glasses
   c. School rent glasses to students
   d. School issue glasses on loan for year
   e. Provide class sets of glasses
3. Provide system of monitoring class storage of glasses

HANDLING STUDENT MONIES

Basic Concepts
1. Collect student money in school office
2. Show individual student purchases
3. System should be reasonably foolproof
4. Require minimum of teacher time

STUDENT PERSONNEL SYSTEM

Purpose
1. Prepare students for leadership roles
2. Foster cooperation with fellow workers
3. Acquaint students with social organization of industry

Organization
1. Development of system with students
2. Basic features of system
3. Make system work

FOOTNOTES

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AIAA. TH-1:15-6.

A MERGER - AMERICAN INDUSTRY AND OCCUPATIONAL VERSATILITY. Louis J. Pardini, Associate Professor, Industrial Technical Education, Division of Technology, Arizona State University, Tempe, AZ 85281, and John Lavender, Director, Occupational Versatility, Division of Technology, Arizona State University, Tempe, AZ 85281.

First, let's take a look at these two projects and why such a merger is feasible and desirable. The American Industry Project was developed by Stout State University in Wisconsin in the middle sixties. It is a discipline, and as a discipline it has an identifiable body of knowledge. This body of knowledge being the thirteen basic concepts that are common to all industries and the outside spheres of influence such as government, private property, public interest, natural resources, and competition that affect the operation of an enterprise. The students, as they progress through this program gain an understanding of how industries are organized and operated and how this may influence their lives.

Project Occupational Versatility was developed under Title III Elementary and Secondary Education Act funds in the Highline and Renton School Districts in Seattle, Washington in the early seventies. O.V. is a method through which students learn. Its key feature is that the student is responsible for the selection, direction, management, and evaluation in terms of measurement of his or her performances. Through student responsibility, tests have shown that students significantly improve their abilities of self sufficiency, adaptability, and productivity.

The key feature that makes a merger desirable and feasible lies in the fact that American Industry is a much needed discipline and Occupational Versatility a proven instructional method. A MERGER WOULD COMBINE THESE ATTRIBUTES AND PERHAPS A BETTER PROGRAM WOULD BE THE RESULT.

Another approach in looking at the desirability of a merger would be to examine what may be considered the not so strong aspects of the American Industry and Occupational Versatility projects.

The most common procedure for the delivery of the content of the American Industry Project is through the student development of an enterprise. As the different concepts come into focus it is usually the teacher who initiates the intervention and as the concepts are studied it is usually the teacher presentations that are the resource. This makes the teacher the key figure in terms of direction throughout the program. The program, therefore, usually is "teacher directed."

Also, when the teacher is the prime and most utilized resource, the students are experiencing the utilization of only one type of resource. This does not help prepare them to be versatile in their learning methods.

These not so desirable points would be lessened if the O.V. method of student responsibility were utilized. In the O.V. method, the student is the director and calls upon all types of resource materials as and when they are needed. This gives the student opportunities to learn in many different ways.

O.V. is often looked upon as a program, which it is not. It is a method, and it too has some shortcomings. It does not have an expressed body of knowledge. The most common activity is the making of a project for personal satisfaction. This is a valuable learning experience for a youngster, but falls far short from being what should be considered a total industrial arts program. Problem solving abilities and the finding of personal interest and aptitudes are only part

of a student's exploration of industry. The American Industry discipline would fill this void as it does examine the operation of an enterprise thus in the combining of the two projects, this examination would be done with more interdependence, independence and self sufficiency on the part of the student.

Now that the case has been established as to why a merger, let's take a look at how a merger would operate. To explain this, a description of the development that has taken place to date will be used.

This summer, as has been the practice for the past seven summers, the Industrial Technical Education Department of Arizona State University has conducted a five-week, six-semester-hour credit workshop on the American Industry Project. Fourteen practicing industrial teachers or industrial arts majors were enrolled. Over forty youngsters in the community, ranging from seven to seventeen years of age, came three hours a day for four weeks, voluntarily, to be the students. Four enterprises were formed and the students designed, mass-produced, and marketed their products. Each of the thirteen concepts of industry was explored.

At the end of this five-week session, an outline of a guide for the development of "a student resource bank" was written. It was critiqued by the fourteen teachers in the workshop as well as by two experienced and very successful American Industry teachers, and also the Arizona State Supervisor of Industrial Arts.

The guide outline is designed as follows. A probable sequence of events in the forming and operating of an enterprise is listed in three columns: The Student Procedure; The Facilitation; and The Teacher Procedure. The student procedure column lists the problems or steps they will have to go through from product selection through marketing. After each statement, in the facilitation column, the suggested role of the teacher is explained. Remember - a resource bank is to supplement the teacher, not replace him.

A separate page was then developed for each concept and it also had three columns: The student procedure or problem from the first outline, the anticipated solution, and the resources needed to lead the students to the solution. This list of resources, when developed, will become the "student resource bank." The contents of the bank are numerous and utilize all forms of media. The resource bank would also list many ways in which community resources such as bankers, brokers, union officials, factory managers, and many other members of the community could be utilized as resources for the students.

With this resource bank readily available and well displayed so that students can locate what they need with ease, the teacher should be able to turn more of the "direction" over to the students. From this the students should be able to become more responsible for their learning and more adept at utilizing many different types of learning resources.

Federal and/or state funding is being sought for the development of the "resource bank." Funding is also being requested for the piloting and testing of this merger. We would like to see this development have a national flavor, as well as a local one. We want your contributions, comments, concerns, or what have you! We are presenting our ideas to you at this time because we need and want your help. Any assistance will be gratefully accepted, and we in turn, promise to keep you informed of our progress.

AIAA. TUE-1030-3

A TAXONOMY OF APPLIED METHODS DESIGNED TO INCREASE THE READING ABILITIES AND VERBAL APTITUDES OF STUDENTS IN INDUSTRIAL EDUCATION AND TECHNOLOGY PROGRAMS.

Richard I. Phillips, instructor, Department of Engineering Technology, Texas A & M University, College Station, Texas

A lot of attention is being given to students with poor reading skills and habits. Educators, within the confines of their subject area, can aid in remedying some of these problems. This paper presents a rationale involving several aspects of reading and verbal abilities--i.e., vocabulary, comprehension, interpretation, etc.-- and also lists practical methods of achieving these skills.

I. Vocabulary

Rationale

The Industrial Arts area has a highly specialized vocabulary that must be learned if students are to gain any insight into our industrialized culture. Special terms are used to denote tools, materials, and processes and students may actually be harmed physically if they cannot translate a given term into its physical representtation.

Strange new words appear for the first time--erg, kerf, hardy hole--and if the teacher fails to educate the student, the following references to these terms and their implications will be meaningless. Finally, since words are continually appearing and/or changing, attempts should be made to keep abreast of new words and their meanings. (Karlin, p.243, 1964)

II. Comprehension Skills

Rationale

Comprehension skills are exceedingly important in the Industrial Arts area. One problem involved here that may not be as prevalent in other areas is the concept of the third dimension. Much of the time students are observing two dimensional drawings and they must be able to comprehend how objects will look in three dimensions.

Students must also be able to follow directions in a precise manner; comprehend the relationship of parts in machinery and construction; derive proper understanding of the contents of trade journals and technical publications; and read and translate accurately dials and scales on measuring equipment. (Cushenberry, p.116, 1972)

III. Intrepretation skills

Rationale

In the field of Industrial Arts the student must go beyond literal or simple understandings to very complex relationships. Mechanical, psychological, physical, and mathematical overlappings must be dealt with daily and a juxtaposition of abstract symbols and relationships must be made with physical components of technology to produce the products demanded.

A scientific method must be learned to observe and record cause and effect relationships so important in the field of technology. Also, since many technical journals and articles have to be read, one must learn to evaluate the author's compentency.

IV. To Improve Work-Study Skills

Rationale

In Industrial Arts, as in every other field, students should be taught correct work and study habits so they will be prepared for a culture that runs on schedules and time tables.

V. To broaden the reading range of students and to develop a more discriminating reading ability especially in regard to Industrial Arts.

Rationale

Diversified reading widens students' fields of experience by putting them in contact with situations that they might not otherwise experience.

By developing a more discriminating reading abilitythe readers will be able to apply some of the constants in literature to their own lives to make them more secure persons. This improved reading ability may also enable them to develop a better understanding of their culture and their place in it.

As they examine this culture (if they are an American) they will find it dominated by industry and technology. By reading, perhaps they can see not only the problems and benefits but some solutions as well.

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AIAA. TH-1:15-4.

WHAT OCCUPATIONAL PSYCHOLOGY SAYS TO INDUSTRIAL ARTS

Ralph Ressler, Associate Professor, Department of Vocational and Technical Education, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Occupational psychology is that field which deals with *occupational* growth and development. This emerging field has something to say to industrial arts especially, because industrial arts often represents the sole opportunity many students have to become involved in mechanical kinds of activity while still in school. It has historically had a strong junior high school program. Percentage-wise, about half its students are at this level today.

Occupational psychologists note the presence of distinctive *"stages"* or phases each of us pass through in our occupational development. They do not all agree upon what to call each or the exact age limits of each stage. Generally speaking, however, these are: "fantasy", tentative decision, exploratory, "establishment", maintenance, preparatory for retirement/second career and the retirement stages.

The school's responsibility in each is clear. Of most importance to industrial arts are, of course, those responsibilities associated with the tentative decision and exploratory stages. These are found in the junior as well as senior high school. While occupational guidance is only <u>one</u> aspect of industrial arts, the pervasive purpose of any exploratory course is to "contribute to [student's] guidance in occupational selection or [for] further education".

Another proposition put forth by occupational psychologists is that certain *factors* influence one's career selection. Among them, only two are cited which can be manipulated by educators: *career models* and *"try out"* experiences. The term career models, is a self-exploratory one whose connotation is a face-to-face encounter between students and adults who represent life models and who can also alert students to interesting, appropriate careers.

The idea of try out experiences and their importance, however, has a special significance for industrial arts. A try out experience is merely an opportunity for students to function in as realistic a manner as possible, in an occupational-like fashion. That is, to actually perform occupational tasks or to simulate actual occupational activities. Occupational psychologist John Holland has noted six what he calls "work environments". It is within these work environments that try out experiences can occur. He noted personality types seek appropriate environments and described these as work environments. They are social, creative, investigative, enterprising, mechanical and conventional.

The *social* environment involves helping, caring or "feeling" for others; the *enterprising* work environment with leading, directing, managing or persuading kinds of activities; the *investigative:* analyzing, reading and problem solving efforts; the *conventional* involves routine, repetitive verbal or numerical processing tasks; the *mechanical* work environment involves tools, machines and using mechanical aptitude; and finally, the *creative* work environment is one in which there is freedom to express, imagine, invent and use originality. These environments are not usually found in a "pure" state, but rather exist in various combinations. One, however, is usually predominant. Some are the antithesis of one another.

Ideally, every student, during the tentative decision and exploratory stages, has opportunities to experience try out activities in each of these different work environments. The State of Virginia employs an occupational orientation course based upon this concept which precedes the exploratory courses.

Should industrial arts *purposefully* offer students an opportunity for try out experiences in each? Does it now?

Most certainly it should, just as all exploratory courses should. Does it now? Let's look:

In the social work environment for example, do industrial arts students have an opportunity to voluntarily help poorer, younger or less experienced students?

In the conventional, do they have opportunities to do repetitive, routine, short term type work? To follow rules?

In the creative, do they have an opportunity to use their imagination free of restrictions? To invent?

In the mechanical, do they have a chance to use tools and machines, produce tangible products and use their mechanical aptitude?

Do they have a chance to 'sell', lead, manage as they should in the enterprising work environment?

And finally, in the investigative, do they have a chance to problem solve? To deal with abstract concepts?

Assuming these experiences do exist in industrial arts, are they *ordered* in terms of scope and sequence? Do these opportunities progress from the simple to the complex? Do combinations exist? We have not given much thought to this, instead spending a good deal of energy as a profession defining the scope and sequence of our subject matter and some to psychomotor development, too. Yet, when contrasted with subject matter content as a determinant of occupational selection, try out opportunities (which are basically affective in nature) are significantly more valuable. Industrial arts, just as other subjects, is prone to focus upon its subject matter content (the cognative domain) overlooking other dimensions.

What occupational psychology is saying to industrial arts is simply that the most pervasive, meaningful dimension of industrial arts, as far as occupational growth and development of young people is concerned, lies in its unique capacity to allow students to test 'self' within various work environments, especially the mechanical work environment. Current curriculum developers in this field should be the first to logically integrate the concepts of occupational psychology into the curriculum. The scope and sequence of such experiences in industrial arts should be researched. Teacher educators should re-focus the attention of their students away from solely the cognative dimensions of the curriculum and onto the affective. For when all is said and done, while today's youth may retain only 10% of the cognative material they learn, they internalize considerably more of the affective.

This integration of appropriate try out experiences in various work environments found in industrial arts can be done through *teaching method* in most cases. Subject matter need not be disturbed when accomodating such try out experiences.

In essence, then, while occupational psychology may say much more to industrial arts educators in the future, for now the recognition that method is in some ways *more* important than content is of some note!

AIAA TH-2:30-1

PIAGET AND TEACHING INDUSTRIAL ARTS. David K. Gore, Instructor, University of Northern Iowa, Cedar Falls, Iowa and Anthony E. Schwaller, Assistant Professor, Eastern Illinois University, Charleston, Illinois.

As industrial arts teachers graduate from college and start their careers in education, they are faced with many problems not necessarily discussed in their undergraduate programs. One problem which exists is for teachers to apply the "process of learning" to a classroom situation. If teacher education includes concepts of industrial arts, it stands to reason that there should also be an understanding of the process of learning. Fowler, Koen, and Nacozy (1976, 19) stated the problem clearly when they wrote "All teachers do not have an ability to transfer knowledge and procedures. In fact, few teachers ever produced such momentous effects. Why is this? One reason might be a lack of training in learning theory..."

Many psychologists and educators have stated strong and concise definitions of learning including Dewey, Gagne, Sidney, Piaget and others but few have applied their definitions specifically to industrial arts education. The purpose of this paper is to apply a specific learning theory, Piaget, to the industrial arts classroom and show how we as teachers may enhance the "learning process."

Piaget and Learning – While Piaget's approach to understanding human behavior reflect his background of biological training, it should be remembered that he is first and foremost a developmental psychologist (age-stage psychologist). This implies that Piaget discusses psychology of learning theory in relationship to child development. The concepts Piaget derives at this level appear to be directly related to learning in a classroom environment at all levels of education, including that of industrial arts.

Among much of Piaget's developmental concepts three specific terms continually emerge. These terms are 1) schemes, 2) assimulation, and 3) accommodation.

Schemes – Furth (1969, 265) defines schemes as internal structures, categories or groups of objects in which data from the environment can readily be placed. Piaget refers to these groups as a "scheme", while other authors have used the terms "schemata" or "learning set." Whatever the term used, scheme still relates in a broad sense to the structures, categories or groups used to classify data internally.

Assimulation – Assimulation is defined by Furth (1969, 260) as "taking in of environmental data..." The cognitive information given in a classroom lecture might be internalized through the process of assimulation of data into schemes. This process is continuous and data from the environment or real world is usually brought in by the five senses.

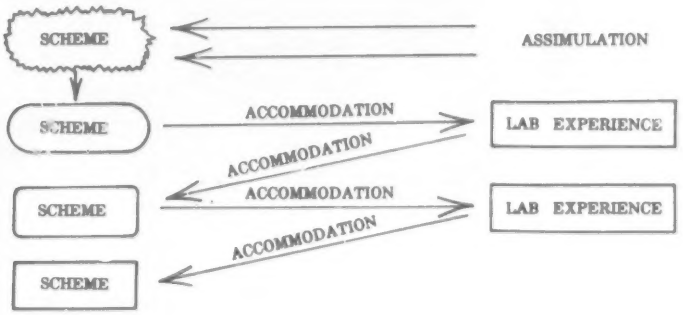
Accommodation – Accommodation can be defined as the "application of an active scheme to a given problem or event (Furth, 1969, 85). Accommodation is an outgoing process whereas assimulation is an ingoing process. As an example, if several data were assimulated into schemes a concept may be developed. When this concept is applied to a problem, accommodation is taking place. To expand this definition, the process of accommodation may also contain some element of newness from the environment. It could be found that the extended concept developed may not adequately fit the environment. An inadequacy may be the external result. If the schemes are restructured internally and again accommodated, the "process of accommodation is taking place. Many other authors have defined this process. Lawrence Cremin (1964, 122) indicates for John Dewey that "this method of education...was the continuous reconstruction of experience which increases the ability to direct the course of subsequent experience." Dewey refers to the successful reconstruction of experience in problem solving as "consumation." Another term that relates to accommodation is "reconceptualizing." Simply stated, this means that when a concept is tried in the real world and it doesn't fit the environment, the concept will be reconceptualized until it does fit. In order to reconceptualize adequately, either more data from the real world will be needed or a new arrangement of existing data must be developed internally. This outgoing process of continually reconceptualizing or accommodating is called the "learning process."

The process of accommodation in many classrooms in our educational system unfortunately is only slightly considered. The students simply absorb or internalize all the data (assimulation) in the classroom. Many times there is no chance for externalizing and thus no process of accomodation. The question then is posed, what can we as industrial arts teachers do in a classroom to enhance the process of accommodation or reconceptualization, which has been defined by Piaget as "learning."

Examples in the Classroom – It is imperative that we as teachers, specifically industrial arts teachers, apply what Piaget has been saying. Following Piaget through a typical industrial arts classroom and comparing that to a model of his theory will help make the process clear. To begin, let's use as example in the area of energy technology. If a concept deals with timing an engine, the students become aware of certain thoughts and possibly past experiences. This is what Piaget calls "schemes" and are the categories where new information about timing an engine can be included. As an industrial arts teacher is lecturing he is adding to the previously held knowledge. This is called assimulation. The illustration below indicates that previous information about timing an engine has been added to the existing schemes. The assimulated knowedge or data is that when the timing is advanced, the engine will ping. At this point the students need to go into the laboratory to verify the data about timing an engine.

The laboratory assignment should afford some degree of challenge to direct the student into a problem-solving situation. At the same time the laboratory experience should be relevant to the kinds of problems and situations that occur in the real world. The laboratory should be used as a portion of the real world that we are able to control to allow the type of situation necessary for the learning process to take place.

In the laboratory the students found that when the timing was advanced only 2 degrees, no pinging occured, therefore an inadequacy developed between what was said in the lecture and what was actually observed in the laboratory. This is what Piaget calls the accommodation stage and is represented in the illustration by an arrow. To resolve the problem it was necessary to experience some new data which newness mentioned earlier. In the example, the student should then advance the timing by 4 degrees then 6 degrees until pinging occured. This is considered by Piaget to be the process of learning. The following illustration shows this process graphically.



As with any experience the number of times one must go through the accommodation step to reshape or reconceptualize the scheme may vary. It may be as simple as one step or extremely complex and include many steps. Because of this process of accommodation the student has learned that advance timing causes pinging only after the timing has been advanced a certain number o degrees. The process of accommodation has directed the student to refine and further categorize the advanced timing data. The student has reached a higher level of d iscrimination due to the development of more categories of schemes.

As you are now probably aware the authors really don't expect the readers to have learned what was said about Piaget until they have actually tried the model in their own classroom and actually go through the accommodation process.

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TECHNOLOGY

AIAA SPECIAL INTEREST SESSION. TH-3:45-2

CERAMIC TECHNOLOGY-IMPLICATIONS FOR THE INDUSTRIAL ARTS PROGRAM.

Cheng C. Liu, Associate Proffesor, Department of Industrial Arts and Technology, State University College, Oswego, New York.

Thumbing through the 1977-78 edition of Industrial Teacher Education Directory, you will find about 15 Industrial arts/ industrial education teacher education institutions specifying "ceramics" as part of the teaching assignment of their staff members. Granted there are a large number of schools out of a list of 261 Departments that do not offer IA/IE programs, it is safe to say that there are not more than 1/10 of the IA/IE institutions in the nation offering courses in ceramic technology or ceramic science area. It is conceivable that units of study in ceramics may be incorporated in a more popular offering such as "materials and processes". Data relative to this claim are not available at this time.

This presentation will attempt to: 1) review briefly the past and the present ceramic course offering at the IA/IE teacher education institutions and in public schools, 2) introduce and assess the current ceramic technology and the con tribution it has to space age man and society, 3) suggest ceramic course content universe for IA/IE teacher education programs and 4) suggest ceramic course content areas and activities for public school industrial arts programs.

Review of the past and the present ceramic courses. Some ceramic courses were offered by IA/IE teacher education institutions and public schools in the past few decades but the confusion of the content area made most schools drop their offerings. When slip casting and hand building of clayware were major activities of the industrial arts ceramics courses. the need of ceramics in industrial arts programs was no longer justifiable: the area is covered by art teachers in the school.

Introduction and assessment of current ceramic technology. To many people ceramics means vase, bowls, and ashtrays shaped from moist clay and hardened in a heated kiln. Perhaps a majority realize that ceramic materials are all around them: bricks, glass, bathtubs, spark plugs, tiles,cement, false teeth, Pyroceram cookware, insulators on power lines, flower pots, sand paper and the plates from which we eat meals. But relatively few are aware that an explosion is occuring in the ceramic field. It is safe to say that electronics and aerospace enterprises have been launched by the dramatic advances of ceramic science during the past 30 years. Computers, solar energy cells, nuclear reactors, solid state circuitry, space vehicles, and modern steel production are all dependent on new ceramic materials.

Suggested ceramic course content for IA/IE teacher education programs. In as much as the above statement about the importance of ceramic technology in the total industrial technology domain the IA/IE education institution can not afford not to teach their future graduates about ceramic materials, processes and products. The author propose[5] that the following areas be included in a separate ceramics course or be a segment of materials and processes course:

definition and scope of ceramic technology

stone industry
refractories
gypsum
lime
cement and concrete
structural clay products
whitewares
glazes
glass
porcelain enamels
abrasives
technical ceramics

Suggested ceramic course content for public school industrial arts programs. The content areas for public school ceramic programs are dependent upon levels of instruction. At the high school level the content could lean toward the college segmentations. But at the junior high or middle school level the emphasis, as in other areas of industrial arts programs should be more toward the introduction to ceramics as a field of their pursuit in the future in terms of occupational awareness and basic skill development in the proper use of common industrial tools, machines, and processes. Suggested activities include:

cut and polish stones
casting, jiggering, extrusion, and ram pressing clay products
etching, engraving, and heating glasses
manufacture plaster mold and wall board
copper enameling
glazing and silk screen printing on ceramic ware
manufacture abrasive stones
pouring concrete objects

More information relative to suggested activities at any instructional level are available from the author.

AIAA. W-10:45-2.

TECHNOLOGY IN THE MIDDLE SCHOOL. E. Allen Bame, Assistant Professor, Industrial Arts Education, Virginia Polytechnic Institute & State Univeristy, Blacksburg, Virginia.

The growing interest in a technology based industrial arts curriculum is being extended into the middle school. As this continues it is important that the effort be based on a sound foundation. The transitional function of the middle school organizational concept must be considered along with the unique characteristics of the early adolescent middle school student. Curriculum content must be interfaced with these two.

The Middle School

Transitional - Provides for gradual progression from the self-contained classroom of the elementary school to the specialized instruction in the departmentalized high school.

Exploratory- Provides for a wide variety of possibilities for developing a broad based cultural awareness.

Understanding - The total school experience - the educators, the facility as well as the curriculum - must be understanding of the early adolescent child. Each must be developed to meet the needs of this age group.

The Student

Early Adolescent - This age group of students is characterized by a need for acceptance by peers, a desire to participate and to develop a feeling of belonging. There is a desire to explore different career, social, cultural and intellectual possibilities. This child has a competetive spirit, a changing body, and a maturing mind. Intellectually, the child is developing an increasing ability to conceptualize, and to handle abstractions. These are coupled with alternating periods of intense interest and periods of seeming disinterest. All this adds up to a student who is changing, often moody with periods of worry or concern and introspection. The overriding characteristic seems to be activity.

Technology Curriculum

Exploratory - Allows the student to explore rather than present a rigidly structured "cook book" type of program.

Broad and Fundamental - At this educational level concepts to be learned should be those which provide for broad understanding rather than in-depth knowledge. This provides a conceptual "skeleton" upon which the "flesh" of future learning can be built.

Systems Focus - Consistent with the fundamental nature of the curriculum content, the focus should be on the technical and social/cultural systems of technology. It is important that the student obtain the global or wholistic view before in-depth details are learned. Production, communication, and transportation can be the broadest of these organizing categories.

Interdisciplinary - Technology does not exist as a separate entity, but rather, is truly universal, crossing the lines of traditional disciplines. This universality must be reflected in its study.

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AIAA. T-7:00-3.

ACTIVITIES IN SOLVING TECHNOLOGICAL PROBLEMS. Richard A. Kruppa, Professor & Chair, Manufacturing Technologies, Bowling Green State University, Bowling Green, Ohio 43402.

The purpose of this presentation is to share with you the outcome of some development work which has yielded activities in technology problem solving for undergraduate students. IET 152, "Introduction To Technology--The Man-Made World," introduces students to principles and developments which consider technology as shaper of the man-made world. The course is required of majors in the Department of Industrial Education and Technology, and is an elective offering to other students at Bowling Green State University. While essentially a lecture course, the course employs an activity component as well. I wish to share with you, today, a description of these activities, and how they are employed in the course.

As the course proceeds a technology problem solving activity session is employed about every other week. The purpose of these sessions is either to provide first-hand experiences in principles being explored through other techniques in the course or to present, through simulations, examples of technology-related or caused problems. Let me illustrate the activities for you, not necessarily in the sequence in which they are employed in the course.

Activity One--"Communications in Space."

This activity is a modified version of a similar activity prepared for science and elementary teachers by N.A.S.A. To begin the activity the class is reminded of the problems the Appolo 13 mission encountered during its moon mission. An explosion on board forced engineers on the ground to relay to the astronauts ways in which they could modify existing systems and hardware to stay alive while "sling shoting" the moon and awaiting their return to earth.

Pairs of students are then teamed to participate in an activity intended to dramatize the difficulty of solving concrete problems using only verbal communications. One student in each of the pairs can observe an assembly of colored blocks of various lengths. Each block has a different color on each surface. It is the problem of the team to construct a duplicate assembly of blocks, using only verbal communications. All teams function in a competitive fashion. At the conclusion, the fastest and slowest teams discuss with the other team members their respective technologies.

Activity Two--"Managing A Construction Project."

An activity similar to this was described to me by a colleague in our construction technology program. It was modified as follows. At the outset of the activity the class is divided into teams of four-to-six. Discussion is conducted regarding some problems in construction management. It is concluded that management planning time can be much less costly than construction production time when considering the hourly or daily cost of specialized construction equipment, etc. The point is made that it can be cost effective to spend considerable time in planning so as to facilitate particularly effective use of people, equipment and materials on the site.

The students are next shown a structure which has been made from wood modules. Each size module is of a different color and is one half or twice the length of others. All pieces have the same cross sectional size and shape.

Each team is then given all the necessary pieces to build a duplicate structure. The problem is then posed to the teams. Spend as much time as necessary in studying the model, inventorying the building parts, etc., so that upon being given a signal to begin, a duplicate structure can be constructed in the shortest possible time.

As with the earlier activity the various teams discuss the relative merits of their construction management and production technologies at the conclusion of the activity.

Activity Three—"Cable Clamp Assembly"

This activity is conducted by teams of two students. They are given containers holding the components of eight cable clamps. They also have a stop watch. They are instructed to have one team member play the role of a manufacturing manager and trainer and the other the role of a production worker. The manager, then, trains the worker for the job of cable clamp assemblier. Following training, the worker assembles the clamps according to his instructions and an average time for assembly is determined. At this point the instructor intervenes and suggests that the manager and worker in conference might be able to increase the efficiency of the assembly operation. The two are asked to discuss the assembly operation and to optimize it. They do and then repeat the assembly, again recording times. Times from the two assembly sessions are compared and the team discusses their results with that of the other teams.

Other problem solving activities include:

Roundness Assessment
Planet Management Game
The Assembly Line
Weight Ranking Algorithm

Space prohibits a description of these activities, but a complete copy of the presentation is available by writing the author.

YOUTH'S NEEDS FOR TECHNOLOGICAL LITERACY. Donald G. Lux, professor, Academic Faculty of Industrial Technology Education, The Ohio State University, Columbus, Ohio.

This paper is not a report about some planned, ongoing, or completed research or development project. It is a call to action!

A crisis confronts us. It stems from a variety of complex forces which have been gathering in the mainstream of educational dialogue for at least two decades. Put most simply, these forces fundamentally derive from public concerns about increasing educational costs and decreasing performance.

In times of crisis there often is a temptation to go back to what has worked before. And it is clearly evident that many are yielding to this temptation. The battle cry of this movement is "Back to the basics!"

This is just another way of saying "cut out the frills." Almost invariably the fine and applied arts, along with physical education, feel the axe in times such as these.

To cut the "frills" may be the surest way to contribute to the further demise of the "basics." Hechinger speaks concisely to this point in the February/March issue of "Todays Education."

"The fallacy in the present tendency to strip education down to the three R's, whether for pedagogical or fiscal reasons, is that it can only make the basic skills appear less useful to the children. What is motivation if not getting the learner to connect the effort of acquiring skills with their application to something that is interesting and (if the descendants of the Latin masters will pardon the suggestion) fun? A child's interest in learning to read and write is stifled if the rest of the school program is barren. The stripped down, no frills basic curriculum allows for too little transfer of skills to other areas--creative, artistic, or just plain interesting. The harm that can be done to the three R's by the elimination of school newspapers or other extracurricular activities that require basic skills should be evident to everyone concerned."

However, to attempt to forestall the return to basics movement by simply claiming industrial arts is needed, is not an adequate response. Handicrafts and manual training-type programs are not what is needed. Industrial arts more than ever before must concern itself with technological literacy development.

The ability to understand, appreciate, and efficiently make and use the man-made world may be defined as industrial technological literacy, an important part of technological literacy.

Traditional programs of industrial arts may once have provided adequately for technological literacy. But then, so did other subjects once provide academic literacy. Neither can now hope to survive or improve by going back to what used to work.

There is a symbiotic relationship between academic and so-called non-academic subjects. Together, well conceived and well taught, they can develop minimum competencies in the three R's and develop technological literacy.

Why is it so difficult for industrial arts teachers to change? In the era when we began teaching drawing, metalworking, and woodworking, the Wright brothers were developing a box kite-like, flimsy airplane. Today we have the 747. Must we still settle for traditional industrial arts?

Students have tried to tell us that they are disillusioned and disenchanted with the kind of education they have been getting. Others also have tried to redirect us. McLuhan says: "The student finds no means of involvement for himself and cannot discover how the educational scheme relates to his mythic world of electronically processed data and experience that his clear and direct responses report. The young today reject goals. They want roles--r-o-l-e-s. That is, total involvement. They do not want fragmented, specialized goals or jobs. The dropout represents a rejection of nineteenth-century technology as manifested in our educational establishments."

To this he adds: "Today's television student is attuned to up to the minute 'adult news'--inflation, rioting, war, taxes, crime, bathing beauties--and is bewildered when he enters the nineteenth-century environment that still characterizes the educational establishment, where information is scarce but ordered and structured by fragmented, classified patterns, subjects and schedules. It is naturally an environment much like any factory setup with its inventories and assembly lines."

Bronowski produced programs on the ascent of man which have been viewed on TV by millions and books which have been read by yet other millions. He writes: "I believe that as soon as the forerunner of man began to be nimble with their hands and clever with their brains in planning them, the nimble and clever enjoyed a selective advantage. They were able to get more mates and to beget and feed more children than the rest. If my speculation about this is right, it explains how the nimble-fingered and quick-witted were able to dominate the biological evolution of man, and take it ahead so fast. And it shows that even in his biological evolution, man has been nudged and driven by a cultural talent, the ability to make tools and communal plans...".

If he is correct in his assumptions, imagine the fate of man if we ignore this point and let the quick-witted and dull-fingered rule. What stronger contemporary evidence can one find to support the Woodward-Dewey notion that we had best send the whole child to school, both sides of the brain included.

Clearly, we are threatened as never before. Our response must not be to try to return to the basics, either in education generally or in industrial arts. We must aggressively seek to define and communicate youth's needs for technological literacy and then create programs which clearly respond to these needs.

In addition, we must be alert to the activities in making needs assessments and competency tests. We must help to define the contemporary needs of youth to include the relatively new but essential need for technological literacy. As well, we must help to see that any adequate listing of competencies includes technological performance standards.

We cannot leave these important tasks to the academicians and vocationalists. They are prone to focus on the ends of the knowledge continuum, largely ignoring the middle.

If industrial arts moves quickly, clearly presents evidence of the need for technological literacy, and provides programs which can be judged to be responsive to the need, the current situation can cause industrial arts to prosper. More importantly, we will have provided an important part of one of the essential educational needs of American youth--their need for technological literacy.

AIAA. TH-3:45-2

APPROPRIATE TECHNOLOGY AND COMMUNITY DEVELOPMENT. John M. Manchester, doctoral fellow, Technology Education Program, West Virginia University, Morgantown, West Virginia.

Throughout human history the technologies that societies have adopted have had significant impact on the types of communities that have been formed. Nomadic societies of hunters and gatherers were the rule until early agricultural tools and techniques were developed. Urban settlements became possible only with the advent of agricultural technology because agricultural systems free some community members from the responsibility of providing their own food and allow them to develop the specialized trades and services that characterize urban settlements. Mill towns resulted from the combination of labor-intensive manufacturing processes and the ability to convert large stores of potential energy (e.g., water in a river) to useful work in powering machinery. Suburbs would be unknown if the technologies involved in transporting workers from homes outside the city to workplaces within the city in a short period of time had not been developed.

It would certainly be foolish to claim that technology has been the sole factor in determining the forms that communities have taken until now, but we should be able to agree that it can plan a major role alongside social, cultural, political, and economic determinants. Given this assertion, there seem to be three important questions to address:

(1) Are there certain features about "healthy" communities that we can identify and that we would agree would be beneficial to maintain or establish in communities now and in the future?
(2) What would be the technologies that would best help us create these healthy communities?
(3) What are the implications for us as educators?

I propose that if we begin to examine the following factors we will start to approach the concept of health or the quality of life in our communities: self-reliance, employment possibilities, environment, local control, and individual choice. Self-reliance on the community level draws upon our strong national heritage of self-sufficient communities and brings the context of self-sufficiency into a modern framework. It involves looking at the needs of the people in the community and garnering the resources of the community (material and human) to try to satisfy those needs as much as possible without relying on outside inputs. Note that this contemporary form of self-reliance and community cooperation to meet needs is a choice and not a necessity.

The amount and type of employment opportunities within the community could be seen as another measure of the health of that community. Full employment for all those community members seeking jobs at jobs that would enable workers to explore their physical and mental capacity could be a goal for community development.

Working and living environments that not only are benign in terms of health disamenities to community members but which also remain dynamic and complex enough to inspire community people to learn more about natural systems might be another goal.

Healthy communities might also be determined by the amount of local control that the community has over its own affairs (which may in turn depend on the degree of community participation in policy-making within the community) and the amount of choice that an individual

has for adopting a personal lifestyle.

Technologies that could help us approach these goals of self-reliance, high employment, clean environment, local control, and individual choice could be considered appropriate for creating or maintaining healthy communities. Appropriate technologies seek to provide for basic community needs of food, clothing, shelter, energy, security, and social-psychological needs using available human and material resources of the community. Technologies usually considered appropriate at the community level include small-scale food production and processing (gardening, hydroponics, aquaculture, drying, canning), renewable energy source conversion (biomass thermal processes, wind-electric power generation, solar-thermal, solar-electric, hydroelectric), community construction, natural clothes manufacturing, and small-scale industry based upon renewable resources and/or waste materials.

The problem is not that the technologies that would support our goals of community development have not been developed; the problem is that we have never systematically approached community development from this perspective before. We are now asking what would be those technologies most appropriate for reaching our communal goals, not what are the technologies that will have the greatest economic payback for investors. We should now recognize that capital gains and profit statements are only one possible goal that a community may set for itself.

In this paper I suggest five alternative goals for community development. As educators I feel it is imperative that we keep our minds open to alternatives such as these <u>not</u> in order to push these ideas and their related values on our students but to present new ideas to them that they may wish to investigate as individuals living within communities. There <u>are</u> alternative futures for our communities if we wish, and there <u>are</u> alternative technologies we may wish to adopt to help reach these futures. Teachers in the technologies can make a great contribution to helping our communities conform to our goals if we constantly base our discussions and demonstrations of technology within a social-cultural context and if we continually help students determine what technologies would be most appropriate for reaching community goals. Without this strong educational effort directed toward assessing technologies, adoption of the most appropriate technologies for communities will be impossible.

AIAA. WED. 7:00-8:30 P.M.

TECHNOLOGY TODAY: IMPLICATIONS FOR INDUSTRIAL ARTS

David Mohan, Associate Professor, School of Technology,
Kent State University, Kent, Ohio.

Since man first identified a need for efficiency and adaptability when dealing with a hostile environment, technology has been a pervasive force in the continuing struggle for reconciliation with nature. Through the millenniums of cultural evolution, mankind's dependence on technology to solve the myriad of human problems has increased significantly. Exemplary of society's current reliance upon technology, is the emergence of "technological fix". The "technological fix" is a technical solution developed to solve a social problem without fully addressing the concomitant sociological considerations. The extent to which civilization has placed a growing dependence on technology suggests an immediate need for an educated citizenry to intelligently assess and legislate technological impact upon the contours of society.

Technology by definition and substance has profound implications for formal education in general and industrial arts specifically. A basic objective of public education in a democratic society is the development of individuals knowledgeable of the dynamic forces within their society. In the United States and other developed nations of the world, technology is recognized as a primary factor in shaping a nation's future. However, technology and its global implications are not addressed in the content of American education beyond an adjunct association with various liberal arts subjects.

During the past several decades, numerous theorists in industrial arts have espoused the need for their general education content area to address the educational abyss regarding instruction in technology. To date, various industrial arts curriculum projects have been developed which attend to some technological elements. The dissemination of industrial arts curriculum software dealing with technology is a significant accomplishment for the profession, but represents only a partial advance in the total instruction necessary for students to comprehend applied science and its impact vis-a-vis their society.

The need for a content area of public education to assume a leadership role regarding instruction in "Technology and Man" is apparent. The obvious educational sector uniquely suited to address such content is industrial arts. Since industrial arts currently has laboratory facilities, equipment and instructors knowledgeable in processes and "technique", the actualization of an industrial technology curriculum is a logical direction.

Should industrial arts accept industrial technology as a content priority then several aspects associated with this subject matter must also be considered. Besides the obvious focus on technique, processes and products, instruction must also include appropriate nomenclature. Words such as technostructure, technocracy, technological assessment, alternative technology, technological transfer and others should be defined and discussed to provide insight into their significance. Additionally, interdepartmental activities between industrial arts and the sciences can provide opportunities for students to experience research ranging from discovery to application.

Utilizing current periodicals, texts, and other library and community resources, the industrial arts teacher can amplify the broad implications technology has concerning the following:

Life Style (Leisure)
Quality of Life
Cultural Lag
International Trade
Careers
Consumerism

Each of the aforementioned topics can be an instructional unit since vast amounts of information currently exists regarding technology and societal impact.

As society and our federal government place greater emphasis on technological literacy, a curriculum area with appropriate expertise could provide significant instructional service. Industrial arts functioning as a component of general education is philosophically and conceptually the logical content area to convey technological literacy to the students of today, who will be the voting and governing citizenry of tomorrow.

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2. Mallow, E.W. Teaching a Technology. South Africa: Witwatersrand University Press, 1965.
3. McIrvine, Edwin. Dialogue on Technology. New York: Bobbs-Merrill, 1967.
4. Susskind, Charles. Understanding Technology. Baltimore: The Johns Hopkins University Press, 1973.

THEORY

ACESIA. T-10:45-11.

IMPLICATIONS OF PIAGETIAN THEORY FOR EARLY CHILDHOOD INDUSTRIAL ARTS: COGNITIVE DEVELOPMENT. Richard J. Dahl, assistant professor, School of Education, State University College - Potsdam, Potsdam, New York.

Why does a child of four or five years take an Oreo cookie apart before eating it? The obvious and common reply to this inquiry is that a child is interested in eating the center filling before the wafers. Such a reply may often be confirmed by questioning a child who is engaged in the act. This act may be appropriately labeled as an affective response or behavior. There remains, however, a cognitive explanation for this and an entire series of related behaviors. This explanation is based upon theory offering insight into four critical questions confronting those of us concerned with early childhood industrial arts programs--the *what, when, how,* and *why* of teaching.

The theory which appears to offer insight into the cognitive development of young children and which provides educational implications for the development of early childhood industrial arts (ECIA) programs is that of Jean Piaget. The work of Jean Piaget and his Genevan collaborators has presented educators and psychologists alike with a completely new understanding of the child's mind. As Smart, Wetzstein, and Dahl (1976) explained:

> The evidence he (Piaget) raised about man's knowing has provided us with a new conceptual framework from which to view children's mental development and in turn, from which to plan educational programs more appropriately matched to the needs of children. (p. 17)

Piaget is concerned with the development of intelligence--or the development of cognitive structures. He maintains that a key factor in cognitive development is its spontaneity or that intelligence and knowledge cannot be directly transmitted or taught. The young child constructs his knowledge and reality of the world through *physical interactions* in his environment. A child learns to know his world around him through his *actions* and cognitive reorganization process. Inhelder (1962) summarized Piaget's thoughts on this topic when she wrote that the "...development of knowledge seems to be the result of a process of elaboration that is based essentially on the activity of the child" (p. 19).

If the *process of knowing* develops as the child actively interacts with his environment, then it follows that ECIA programs should promote child-centered, activity based curriculums. Such a concept, of course, is not new to the field of elementary school industrial arts. An excerpt from a statement developed by the National Conference for Elementary School Industrial Arts (Hoots, 1971, p. 3) illustrates: "It provides opportunities for developing concepts through concrete experience which include the manipulation of materials, tools, processes, and other methods of discovery".

It is clear that similarities between Piagetian theory and existing elementary school industrial arts methodologies may exist. A more obvious discrepancy may develop, however, concerning ECIA curriculum content. Today, with the widespread interest in early childhood curriculum development, there is a need for empirical data to know the effects of the many traditionally and intuitively valued industrial arts knowledges and skills at this level. The *what* and *why* of ECIA must be known. In addition, if industrial arts is to prove viable either as a subject matter discipline, or as a partner with all units within the curriculum, or as integrated with other subjects within units, or as taught separately but correlated with other subjects as

Hoots (1969) suggests, then we must also attend to the educational implications of the Piagetian system--the *when* and *how* of ECIA. To explore the first function is beyond the scope of this paper. To explore curricular implications, however, is well within our purpose today.

General educational implications derived from Piagetian theory concerning early childhood education are available (Wadsworth, 1971; Farnham-Diggory, 1972; Smart, 1973; Neufeld, 1976) and are further delineated here with respect to ECIA programs.

(1) Provide the child with diverse opportunities to cognitively reorganize new processes, materials and equipment. A teacher assists in the activity, but remembers that young children learn through direct interaction with their environment--not by observing the teacher.

(2) With experience (including interaction with physical tools and materials in his environment) the young child will become more sophisticated in the use of tools and materials. It is extremely important not to confuse the product of learning with the process of learning. The teacher will have to exercise restraint in dictating form and procedure. What may appear to the adult as a few bent nails and a rough-sawn board may actually represent a grand oceanliner in the child's mind.

(3) The young child views his world differently than the adult. Whether he mentally alters his views or not often depends upon the nature of the activity the child is engaged in and/or whom he encounters. The necessary development of cognitive dissonance is largely dependent upon the child's perception of personal gain from involvement in a particular activity.

(4) The question concerning the use of commercial equipment and materials in the classroom should be carefully considered. Material overload and environmental confusion are common factors leading to visual and mental distraction. Materials should also be modifiable in order that the young child may adapt them to personal needs. A class of young children building airplanes will rarely produce two alike.

(5) Cognitive development is dependent upon actions. Time is a necessary element to provide for cognitive reorganization processes to occur. Sorting fasteners, counting hammer blows, listening to the saw cutting through a piece of wood, engaging in dramatic and symbolic play, classifying tools by color, weight, etc., are just a few examples of industrial arts related experiences which promote the formation of schemata or mental classifications.

(6) Promote language development. The actively interested and involved child is a potentially endless source of egocentric and social language. Adults play vital roles as language models by eliciting and expanding child language as well as by asking questions which promote cognitive activity and clarification.

(7) Provide for adult/child and child/child interaction through pictures, products, tools, materials, manipulative activities and oral language within small group experiences.

In consideration of four critical questions concerning ECIA programs, Piaget's theory of intellectual development must be translated into specific classroom practices. Roeper and Siegel (1970) maintain that the greatest obstacle to such a translation lies in the difficulty of the adult identifying with the young child's manner of thinking. If curriculum sequences in ECIA programs do not consider the conceptual developmental levels of young children, learning will be ineffectual and grossly inefficient.

TRANSPORTATION

AIAA. TH 2:30 to 3:30

Auto Emissions Control. Jerry Gallagher, Program Coordinator, Auto Emissions Control Training Program, Center for Motor Vehicle Emissions Control and Safety, Department of Industrial Sciences, Colorado State University, Fort Collins, Colorado

Teaching auto emissions control in the Industrial Arts program can be an interesting and rewarding experience. You may have to update yourself with new technology. Your attitude about emissions control and their necessity may have to be altered. Teaching trouble-shooting and good diagnosing procedure will have to be followed. If you don't want to teach the principle of driveability, fuel economy and emissions you will be supporting PCROA (Pollution Control Rip-off Artist).[1] PCROA are those people who bring parts to you that they have removed from their cars and call them teaching aids.

"A school teacher friend of mine (a member of PCROA) advised me that 24-3/4" diameter holes in his air cleaner helped his car run BETTER. By the way, he was at my place seeking help to make his car run better when it was cold...little realizing that his "hole saw" surgery had devastated a well designed air cleaner system which originally provided him with good cold starts.

To qualify for a membership in the PCROA lodge one must abandon the seeking of advice from any but fellow PCROA travellers. PCROA members are the only people who will tell the public the truth about pollution controls. The by-laws read thusly..."Any member that is caught in counsel with persons other than PCROA people shall have their cannister re-installed..."

This is only a sample of how strict a sect the PCROA has become in a few short years.

Don't become a member of this lodge. Bring yourself and your students and neighbors in line with today's technology. "Tune-up procedures are not the same as they were 4 or 5 years ago. The training in low-emissions tune-up is a reality.

The Center for Motor Vehicle Emissions Control and Safety at Colorado State has been very active in development training materials, teaching methods, and curriculum for low-emissions tune-up. The introduction to the concepts of emissions control systems, must be taught early in the automotive class. An understanding of the relationships between ignition, carburetion, engine design and tailpipe emissions are a necessity if your students are to develop a realistic awareness of today's technological changes.

[1]Blimm, James. "Pollution Control Rip-off Artist." 119 East Musser Street, Carson City, Nevada 89701

AIAA
TH 3:45-8

APPROPRIATE TECHNOLOGY IN TRANSPORTATION

DAVID L. DePUE, ASSOCIATE PROFESSOR
PROGRAM FOR THE STUDY OF TECHNOLOGY
WEST VIRGINIA UNIVERSITY
MORGANTOWN, WEST VIRGINIA

Transportation creates value by changing the location of things and people. Transportation also creates value by providing time utility. When this movement is provided in an organized and efficient manner, we call the combined elements a transportation system. Components of a system may be: control, energy and power, guidance, operations, safety, structures, support and suspension. Transportation systems become a technology when reflected upon in the light of human issues. Cultural issues which are relevant in technology studies are: economics, social change, humans and their ideas (biography), innovation and invention, historical development, and contemporary problems resulting from application of the technology.

Transportation technology is appropriate or proper when the respective system seems to fit the particular situation well. Some considerations for appropriateness of transportation systems are resource utilization in energy, materials, capital and human. Other considerations are environmental issues and humanistic concerns in terms of freedom, time and cost.

Energy is an increasingly important concern as transportation is energy intensive. Transportation accounts for 26% of the total U.S. energy use annually. Automobiles, while the least efficient energy users in our transportation system account for the most passenger miles traveled. People of other nations are adopting these wasteful habits.

Material resources must also be considered. Two in short supply are chronium (needed for bearing surfaces) and platinum (used in catalytic converters).

Capital resources are necessary to fund highly expensive future transportation projects and to maintain present systems. Mass transit systems can cost over a hundred million dollars, while maintenance on highway systems and railroads has shown to be a great burden on finances.

Environmental concerns have become common talk among people. A near term solution will be to switch to an alternate power plant for automobiles. The gas turbine and stirling cycle engine are most promising. Electric vehicles are also a certainty; and very appropriate for most of our trips. Public transportation systems could also substitute for many of our automobile uses.

Humanistic concerns cannot be overlooked as we plan for the future. A persons freedom, time and cost is critical. Transportation systems which did not satisfy these needs can and have failed.

A last element of appropriateness is to consider whether some parts of our regular transportation are necessary at all. With the phenominal advances being made in communications during this decade, perhaps we could communicate more and transport less.

TRANSPORTATION IN CURRICULUM

Because transportation is essential in a civilization, it should be included in the public school curriculum. One way to organize transportation technology subject matter is to look at contemporary cultural problems and to study fundamental (critical) technical developments.

Students of WVU have analyzed their communities' transportation systems and collected use data, drew maps, made projections, and made recommendations for improvement. A favorite activity is to duplicate the areas transportation system in a scale model. Elementary school children can start with a sandbox and add swell buildings and replica components. High school and college students would make a detailed layout using plaster of paris, kiene cement, clay and/or casting plastic. Wood and cardboard structures with scale vehicles add realism. An added benefit is the willingness of banks, city facilities and other community organizations to display these small group or class projects.

A look at fundamental technical developments in transportation, past, present and future is an excellent tactic to create an understanding of technical systems. Students can discover critical breakthroughs or landmark patents in transportation. These items might be drawn, a working model constructed, or a display made. Working individually or in teams, students can look at the past and project into the future through a group examination of these breakthroughs in transportation technology. High school students have constructed working models of everything from steam locomotives and paddle wheelers to transit systems using linear induction motors, hovercraft vehicles, and tube propulsion systems.

WOOD

AIAA. TH-3:45-7.
NOISE CONTROL IN WOOD LABS. Edwin C. Hinckley, Professor
Industrial Education Department, Brigham Young University
Provo, Utah 84602

Prevention and control are the critical aspects of noise suppression.

For most noise problems, you will usually have alternate approaches that will reduce the noise level. Convenience, cost, and relative ease of accomplishment each contribute to the solution selected.

The Oliver Machinery Co. produces a quality line of woodworking equipment. But their older twenty-four inch planer with the standard cutterhead was loud. Oliver realized this and did extensive research to produce a cutterhead with a lower "siren effect." The new inserted tooth helical cutterhead does a very effective job of reducing the operating decibal level by a nominal 11 points at a 1976 price of $2,946.00 for a replacement head and grinder.

An identical reduction can be made by enclosing the planer in a box constructed of three-quarter inch high density particle board and quarter inch plywood with a three-quarter inch layer of loose sand boxed between them. Some form of sound absorber such as acoustical fiberglass or sanitary napkins lining the interior of the box, and minimum size openings in the outside wall also contribute to the effectiveness of the enclosure. During research completed at Brigham Young University in 1976, the enclosure cost $104.50. Of course, the box completely enclosed the machine making maintenance more of a problem. Combining the box and segmented cutterhead resulted in a dBA of 64 at the operators position for a reduction of 21 dBA.

Vibrating sheet metal surfaces produce noise. Exhaust system ducts and stamped machine bases are common in wood labs. The best control for exhaust ducts is to place them in the floor surrounded by concrete. If this isn't possible, there are a number of companies that produce vibration dampeners which can be attached to duct surfaces.(1) There is another interesting composite material that functions as a dampener and also absorbs/dissipates sound.(2) The outer layer is an embossed flexible foam plastic, the core is a piece of sheet lead one-sixty-fourth of an inch thick, and the inner layer of smooth foam plastic that is attached to the inner surfaces of noisy sheet metal. Both materials are quite effective.

You may have noticed advertisements for "quiet saws" recently.(3) These saws are less noisy than standard saw blades. If you looked at one closely, you would notice two differences; there are more teeth on the ten-inch combination "quiet saws", and the gullets have relatively sharp corners connected by straight lines instead of the flowing, curved lines of a standard blade. Both of these changes reduce the siren effect and vibration of the saw blade.

Henry Dowse, a graduate student at Brigham Young University, has recently completed extensive research to reduce the noise level of a sixteen-inch Porter jointer.(4) He found many items that contributed to a very unpleasant noise condition. The two major contributors were the table lips on either side of the cutterhead, and the volume and velocity of air being pulled around the cutterhead by the dust collecting system. He produced and tested ten different table-lip plates utilizing different combinations and sizes of holes and slots. The unmodified jointer without the collector

system running produced a dBA reading of 74; with the collector system operating the reading was 81. Using the best set of plates and a modified collector manifold, the readings were 61 (no air) and 62 (air on). The reduction is significant and noticeable to people working on and around this jointer.

Reviewing the dBA readings above shows a definite dBA contribution by the dust collecting system. The secret here is to achieve a balance of the minimum air volume and velocity at the planer and jointer cutterheads that will still provide satisfactory chip pick-up. Very few collector systems are over-capacity for the job they are expected to do. But some are, and experimentation with the damper settings can reduce noise levels.

The laboratory area itself needs to be examined carefully for noise-control possibilities. Typically, Industrial Education labs' ceilings, walls, and floors are considered finished if the base material of concrete, masonry, plywood, or gypsum board is given a coat of paint. Where this is the case, there is nothing to control/absorb/dissipate the noise produced in the lab and it bounces around the lab like a billiard ball on a three-cushion shot. Ideally, at least the ceiling and two walls adjacent to each other should be completely covered with some type of acoustical material. Realistically, this is not practical because acoustical materials are typically very soft and damage easily. The alternative is to treat the ceiling completely with all four walls treated as far down from the ceiling as possible considering windows, storage units, and wall racks in the lab. This treatment works. It makes the lab more habitable when the equipment is running, and also improves demonstrations and discussions by reducing voice echoes.

Teaching woodworking can be even more fun with adoption of these sound control procedures.

References:

1. E-A-R C-2003-107-05/PS. E-A-R Corporation, 376 University Avenue, Westwood, MA 02090
2. Soundmat LF Embossed. Soundmat Products, /07 Umatilla Street, Denver, Colorado 80204
3. Deciban Saws. Systi-matic Co., 519-12th Avenue S., Seattle, WA 98144
4. Dowse, Henry G. "Wood Jointer Noise Control." Masters Thesis, Brigham Young University, 1978.

AIAA. TH-1:15-7.
MASS PRODUCTION IN WOOD TECHNOLOGY PROGRAMS. Roger L. Keep, Professor of Industrial Education, California Polytechnic State University, San Luis Obispo, California.

Mass production in its basic form is simply producing identical products or pieces in quantity. There are a variety of concepts and components that make up mass production. Some of these components are interchangeable parts, transfer of material, economy, and automation. The component of interchangeable parts is a critical part of mass production. Usually in a completed or finished product the parts that make up this product come from several manufacturers. It then becomes critical that any given part of the same type will fit with the other parts of the total. An example of this would be the arm of a chair that must be identical for say perhaps a thousand chairs that are to be exactly the same. Transfer of material refers to the transporting of the base material from one stage to the next in the mass production process. This becomes a very important part of the process when thousands of parts are involved. The third component mentioned, that of economy, is the basis for producing products by mass production. When producing in quantity and having all parts interchangeable produces a tremendous cost savings. The component of automation represents the highest form of mass production. This is where mechanical means or machines do all of the work along the production process.

The above gives a very basic and brief view of mass production and several of the major components. The majority of products that we presently use, whether it be in our homes, industries, or schools, have been mass produced. It is imperative that somewhere within the structure of industrial arts we as educators teach the principles and concepts of mass production. This is particularly true in wood technology in that the products of the wood industry are heavily mass produced. For example, cabinets, furniture, homes, recreational equipment and many other wood products. The principles and practices of mass production cannot be taught in a classroom where individual projects are emphasized. Somewhere we need to include mass production as part of our programs.

The major purpose of this paper is to suggest ways and means of easily introducing and developing mass production concepts in our existing programs. Teaching these concepts need not be a highly sophisticated type of program. Mass production can be incorporated into an existing program without much in the way of cost. Keep in mind the important thing is to teach the principles and concepts and have related experiences, not to spend a great deal of money or time. With this in mind, let me suggest a plan of implementation. First, with your entire class, decide on a product that you would like to produce. By deciding on the product as a group, more will be inclined to take a personal interest in the project and production of the product itself. Several considerations are involved in deciding on a product such as possible consumer demand, appeal, and cost. Once the product is decided upon, then the next stage is to establish an organization. This organization should be patterned after a realistic manufacturing-type company. It can include design teams, management personnel, foremen, and various types of craftsmen. Several ways can be used to develop this type of structure. One way would be to ask the students to indicate what their role within the company should be as they see it. A second way would be for the

instructor to assign the roles based on the ability of the individual students. From this point, the design team will then go to work on the accepted product and start developing plans, material lists, and things of this nature. As this progresses, others could be working on cost factors, production processes and planning. The decisions on the best way of producing the product will be based on cost, efficiency, and methods available. Also, at about this time, decisions should be made relating to the tools, equipment, jigs and fixtures that are necessary in the production of the product. The purpose of the jigs and fixtures is to hold the work or the project and/or to guide the tools. Failing to use jigs and fixtures will cause you to move away from the realm of mass production and back into the realm of producing a single project or product many times over. At this stage, a prototype of the first part can be run through the production process. Once it is determined if the production line process is adequate to the making of the parts, then a flow chart of materials and processes and route sheets can be developed. At this point, the planning and developing stages are complete and the product is ready to go into production. While the laborers or craftsmen are producing the product, another team of students could be working on the marketing aspect of distributing the product. This would include determining the price based on material cost, overhead and assumed labor cost. They would also be deciding the best ways and methods of marketing their finished product.

It is important in attempting to teach mass production that you keep in mind the following points:

1) Be sure you're mass-producing products, not just making the same product several times over.
2) Establish some kind of a production line, where the product moves from station to station.
3) Use some type of method of transfering material from one station to another other than carrying it.
4) Make enough parts or products so that the students really feel that they are mass producing something.

Following the above suggestions in establishing a mass production type activity within your wood technology program will enhance and broaden the experiences of your students. It will help them to understand one of the major segments of industry.

ASSOCIATION BUSINESS

AIAA. Th-9:00 1
TEACHER RECOGNITION PROGRAM. David P. Lorms, Vice President for Classroom Teachers

Forty-seven industrial arts teachers were recognized by the AIAA as Outstanding Teachers for 1978 at the 1978 AIAA Conference, held in Atlanta, Georgia. Forty-four states and three provinces represented the forty-seven associations responsible for the selection of the awards.

The ceremony was held during the third general session on Thursday, March 2, and was addressed by Dr. Lee Hornbake, Vice President of Academic Affairs, University of Maryland. Dr. Hornbake was introduced by his friend Dr. Walter R. Williams, past President of AIAA, 1948-49. Dr. Charles McDaniel, Georgia State Superintendent of Schools, brought greetings to over 1,000 people in attendance.

Each state association is solicited by the Teacher Recognition Committee of the AIAA each year to select an outstanding teacher. The teachers who received awards had been selected by their peers on the basis of their demonstrated ability in the classroom teaching of industrial arts. The following factors are considered in outstanding teacher selection: 1.) Rapport with students; 2.) ability to motivate student interest in industrial arts; 3.) success in upgrading industrial arts in the total school program; and 4.) a well-grounded philosophy in industrial arts education.

Each recipient must be an industrial arts classroom teacher below the college level, and must be active in pertinent professional education associations on the local, state and national levels, as well as a member of the American Industrial Arts Association.

The recipients received an engraved plaque and certificate of honor from the AIAA.

Recipients for 1978 and their state affiliations are:

Industrial Arts Association of Alabama, Bobbie P. Andrusky; Arizona Industrial Education Assn., William E. Abott; California Industrial Education Assn., Kenneth J. Barrett; Colorado Industrial Arts Assn., Dennis C. Smith; Connecticut Industrial Arts Assn., Robert A. Pilvelis, Delaware Industrial Arts Assn., Floyd J. Nutter; Florida Industrial Arts Assn., Jack J. Kelly; Georgia Industrial Arts Assn., Thomas N. Pitchford; Hawaii Industrial Arts Assn., Benny K. Maeda; Idaho Industrial Education Assn., Miles A. Carroll; Illinois Industrial Education Assn., Richard D. Knudsen; Indiana Industrial Education Assn., John A. McCullough; Iowa Industrial Education Assn., Clinton L. Smith; Kansas Industrial Education Assn., Max E. Lundquest; Industrial Arts Section of the Kentucky Education Assn., David G. Hearn; Louisiana Industrial Arts Assn., Lully J. Breaux; Maryland Industrial Arts Assn., Eugene E. Polm; Massachusetts Industrial Education Society, Euegene H. Gauthier; Michigan Industrial Education Society, Willis Fifer, Jr.; Minnesota Industrial Arts Assn., Donald A. Miller; Mississippi Industrial Arts Assn., Dwight O. Lollar; Industrial Arts Association of Missouri, Robert M. Wiegers; Montana Industrial Education Assn., William H. Squires; Nebraska Industrial Education

Assn., Elden D. Kirch; Nevada Industrial Arts Assn., Michael J. Bubonovich; Industrial Arts Education Association of New Jersey, Nelson H. Gray; New Mexico Industrial Arts Assn., Craig O. Spreacker; New York State Industrial Arts Assn., C. David Gierke; North Carolina Industrial Arts Assn., Robert W. Hamlin, Jr.; North Dakota Industrial Arts Assn., Eddie Poeh s; Ohio Industrial Arts Assn., James A. Fox; Oklahoma Industrial Arts Assn., Allen Ledbetter; Oregon Industrial Arts Assn., Andrew J. Hoagland; Industrial Arts Association of Pennsylvania, Vergil Taylor, South Carolina Industrial Arts Education Assn., Kirk M. McCloskey; South Dakota Industrial Education Assn., Roger R. Parham; Tennessee Industrial Arts Assn., Joseph F. Hicks; Texas Industrial Arts Assn., Howard G. Wood; Utah Industrial Education Assn., Fenton W. Billings; Vermont Industrial Arts Teachers' Assn., Richard H. Montague; Virginia Industrial Arts Assn., Donald L. Mason; Washington Industrial Arts Assn., Donald Gallacher; West Virginia Industrial Arts Assn., P. Fred Chavanak; Wyoming Industrial Education Assn., Gary L. Schicketanz; Ind. Ed. Council of the Alberta Teachers' Assn., John M. Shore; Ind. Arts Council of the New Brunswick Teachers' Assn., L. Alan McNair; and Ontario Industrial Arts Teachers' Assn., Ted Tryhorn.

Without the combined efforts of the state associations and the Teacher Recognition Committee of the AIAA, this program could not be as successful as it is each year. The Teacher Recognition Committee wishes to extend a most sincere "thank-you" to all participating associations.

The Teacher Recognition Committee for 1977-78 consisted of the following individuals: David Lorms, chairperson, Texas; Dan C. Lopez, California; Tom Taylor, Texas; Russel Amling, Minnesota; Thomas J. Barber, Ohio; Ken Gile, Vermont; William J. Wilkinson, Pennsylvania; and John Ross, New Brunswick, Canada.

ACTION

HOUSE OF DELEGATES MEETING

AMERICAN INDUSTRIAL ARTS ASSOCIATION

March 3, 1978

Marriott Motor Hotel, Atlanta, Georgia

President Billy W. Mayes, Sr., called the meeting to order at 9:12 a.m. in the Grand Ballroom of the Atlanta Marriott Motor Hotel and appointed Dr. Fred Kagy as Parliamentarian for the 1978 House of Delegates business meeting.

Kagy - Parliamentarian

Dr. Roger Betts, Credentials Chairperson, announced that corrections were made by the Credentials Committee and the list of delegates and alternates who were seated was submitted for the record (see Attachment A).

Delegates and Alternates seated

Billy W. Mayes, Sr., introduced the new and old AIAA officers.

Officers introduced

Donald L. Rathbun, AIAA Executive Director, called attention to the 1977 House of Delegates minutes and entertained a motion to accept the minutes. Robert Sharp, MD, moved to accept and William Scarborough, NC, seconded. Passed.

1977 minutes accepted

The Treasurer's Report was given by Donald L. Rathbun, AIAA Executive Director. Carl York, IL, requested clarification of the note of variance in the cover letter of the audit report. Bob Thrower, NJ, moved to accept the report. Seconded by Dennis Olson, MN. Passed.

Treasurer's Report accepted

219

All life memberships will be paid up in the next four years. All major expenses of the Association were itemized and clarified by the Executive Director. Treasurer's Report not attached. It appears in the complete permanent record only.

Mr. Frank Cackowski, IN, questioned cost center of MST comparison, Exhibit E and Exhibit D of the 1976-77 audit report.

Cost Center Clarified

Mr. Frank Ingram, MI, questioned committee budget expenses regarding over expenditure of some committee activities.

Overexpenditure in some committee budgets noted

Robert Sharp, MD, complimented Mr. Rathbun and the Board for an outstanding Treasurer's Report which indicated explicitly total income and expenses of the Association.

Rathbun & Board complimented on clear & complete report

Membership Report was given by Mr. Rathbun. As of February 17, 1978, the membership was 7,003. This does not include memberships paid during the conference. The membership graph in the Delegate packet was reviewed. Frank Ingram moved to accept the report. Tom Chambliss, TN, seconded.

Membership Report accepted

Billy W. Hayes, Sr., gave the President's Report. Motion by Frank Cackowski, IN, to accept. Miles Carroll, ID, seconded.

1977-78 President's Report accepted

President-Elect Willis E. Ray stated his presidential platform for 1978-79. Gary Henderson, MI, moved to accept. Bryce March, MO, seconded.

1978-79 President's Platform accepted

Lee Carter presented the Acknowledgement Resolutions A-78-1 through A-78-11 and moved that they be accepted in toto. Thurmon Stone, MO, seconded. Passed.

Acknowle Resolutic accepted

Mr. Carter then presented Standing Resolutions S-78-1 through S-78-9 and moved to accept their adoption in toto. Seconded by Thurman Stone, MO. Passed.

Standing Resolutic accepted

Mr. Carter next presented Current Resolution C-78-1, Establishment of a National Industrial Arts Education Week, and announced that each current resolution would be dealt with individually. Seconded by Leonard Fritz, MI. Discussion followed with Franklyn Ingram, MI, speaking to several points. "Education" was added to the title and five times in the content. Passed unanimously as amended.

C-78-1 approved

C-78-2, Support for Efforts of Minnesota Industrial Arts Association. Mr. Carter moved adoption. Charles Allen, FL, seconded. Discussion followed. Tom Ryerson, MN, presented the opposing view of the issue and Dennis Olson, MN, affirmative side. John Bonfadini, VA, supported the motion as did Douglas Lorenz, KY. Bob Thrower, NJ, moved to close debate. John Van Hoose, KY, seconded. The motion to close debate passed. Discussion ceased and the motion to accept C-78-2 passed.

C-78-2 approved

C-78-3, Support of Appropriation for Career Education Implementation Incentive Act of 1977 (PL 95-207) was moved for adoption by Carter. Joseph Bedice, PA, seconded. Passed.

C-78-3 approved

C-78-4, Support of Appropriations for the Vocational Education Amendments of 1976 (PL 94-482) was moved for adoption by Carter. Thomas Clark, GA, seconded. Don Darrow, IA, added to the discussion. Passed unanimously.

C-78-4 approved

C-78-5, Conference Study Committee. Carter moved adoption. Joseph Bedice, PA, seconded. Discussion by Ed Kenyon, FL, Tom Baldwin, WI, Carl York, IL, and Jim LaRue, IA, followed. John Bonfadini, VA, moved to amend the resolution by adding: "Resolved, this study include the feasibility of conducting national conferences bi-annually and regionally on alternating years or other alternative plans, and be it further . . ." Gary Henderson, MI, seconded. Discussion by Tom Baldwin, WI, and Ron Foy, TX (author of the resolution) followed. Tom Chambliss, TN, moved to close debate. William Scarborough, NC, seconded. The motion passed. The question was called and the vote on the amendment passed. John Bonfadini, VA, then called for the question as amended. The vote was taken. The chairperson ruled a division of the house and a stand-up count was taken. The resolution as amended failed. No further action on the resolution was taken.

C-78-5 (as amended) not approved

C-78-6 through C-78-10, all resolutions calling for support of industrial arts supervisor positions in respective states, C-78-6 Nebraska, C-78-7 Michigan, C-78-8 Minnesota (a friendly amendment changed "supervisor" to "consultant"), C-78-9 South Dakota, and C-78-10 Montana, were considered as a block because of their similarity. Carter moved their adoption hearing no objection to the block consideration. William Watts, AZ, seconded. Discussion

C-78-6 through C-78-10 approved

followed by Harry Morgan, Jr., SC and others. The question was called and the vote unanimously affirmed the adoption of all five resolutions.

C-78-11

C-78-11, Support of Full-Time State Level Industrial Arts Supervisors. Carter moved for acceptance. Carl York, IL, seconded. Michael Dyrenfurth, NJ, spoke in support. Motion carried.

C-78-11 Approved

C-77-7

C-77-7, Lee Carter moved to take from the table last year's resolution C-77-7. Robert Thrower, NJ, seconded. The vote was affirmative. The resolution was then read by Carter as follows:

C-77-7 removed from the table

DUES INCENTIVE PLAN

WHEREAS, each state affiliate of the American Industrial Arts Association actively encourages and solicits membership in AIAA, and

C-77-7 read

WHEREAS, many state affiliates have promoted and advertised AIAA membership in local publications, convention activities, direct member mailings, and other means, without concern for reimbursement, be it therefore

RESOLVED, that each state affiliated organization be urged to continue to solicit membership in AIAA from all eligible persons within each state and be it further

RESOLVED, that each AIAA state affiliated organization be reimbursed for services rendered in the amount of one percent return of membership dues sent to AIAA through state affiliates (including regular, associate, college student and retirees and excluding paying life and sustaining memberships,) and, be it further

RESOLVED, that an additional two per-cent return shall be made to all state affiliated associations for "new" memberships in AIAA, and, be it further

RESOLVED, that the AIAA Executive Board direct the national office staff to set up an accounting system for reimbursing state affiliated organizations at the end of each association fiscal year.

Submitted by:

Mr. James H. Bruns, President
Maryland Industrial Arts Association

Mr. Carter yielded to President-Elect Willis E. Ray who spoke at length for the defeat of the resolution because the Board (1) is committed to an incentive plan, (2) a study is being initiated, and (3) a variety of plans will be drafted for Board review and selection. The question was called and the motion failed.

C-77-7 defeated

Mr. Carter then asked for 1979 Resolutions, Standing and Current. Hearing none, the rostrum was surrended to President Hayes who called upon President-Elect Ray to award state affiliation charters to Idaho and West Virginia. Miles Carrol, ID, received the charter for Idaho and James Snyder, WVA for West Virginia.

Call for 1978 resolutions--none offered

Affiliation charters awarded

New Business:

Tom Baldwin, WI, emphasized the advisability of having Board agenda in advance of meetings, but preferred Board minutes. Franklyn Ingram, MI, noted that Board minutes were omitted

Need for minutes and/or agendas raised

from the delegates packet as were the Administrative Committee minutes. Executive Director Rathbun rose to point out that agendas and minutes are available in the AIAA conference office and upon request at other times, but felt it not financially prudent to include the documents in all 138 delegate packets.

Adjournment

No further new business was brought before the House; therefore, Chairperson Mayes moved adjournment. Charles Earhart, OH, seconded. Motion passed. President, Billy W. Mayes, Sr., declared the 1978 AIAA House of Delegates to be adjourned at 11:07 a.m.

Attachments:

A - 1978 Resolutions (Acknowledgment, Standing, and Current)

ATTACHMENT A

AMERICAN INDUSTRIAL ARTS ASSOCIATION

RESOLUTIONS

AIAA CONFERENCE ATLANTA, GEORGIA 1978

ACKNOWLEDGMENT RESOLUTIONS:

A-78-1 Appreciation to the President

WHEREAS, Billy W. Hayes, Sr., as president of the American Industrial Arts Association, has given so liberally of his time and his talents and has exhibited an outstanding capacity for leadership, and the Association has made exemplary progress under his leadership, be it therefore

RESOLVED, that the Association, through its membership, officers and the Executive Board, expresses its fullest appreciation to him.

A-78-2 Appreciation to the Conference Committee, the Program Committee, and the Program and Conference Participants

WHEREAS, The Fortieth Annual Conference of the American Industrial Arts Association was possible through the direct, dependable, and efficient service of a great number of members of the Association, and inasmuch as the Conference has achieved an outstanding level of success, be it therefore

RESOLVED, that sincerest appreciations are expressed to Alfred Newton and John Pollock, General Co-Chairpersons, Robert Hanson and W. Rollin Williams III, Program Co-Chairpersons; to the members of conference committees and to all teachers, supervisors, teacher educators, and students whose efforts in total produced this conference.

A-78-3 Appreciation to the SHIP

WHEREAS, As the continuing support for and the participation in the conduct of the Fortieth Annual Conference of the Association, and in view of the excellence of this year's commercial exhibits as a feature of the Conference, be it therefore

RESOLVED, that the American Industrial Arts Association expresses its appreciation to Educational Exhibitors for their participation in the 1978 Conference.

AIAA RESOLUTIONS
ATLANTA, GEORGIA 1978

ATTACHMENT A

A-78-4 Appreciation to the Teacher Recognition Program

WHEREAS, The Association is dedicated to encouraging excellence in teaching, and inasmuch as its program of recognition of outstanding teachers is marked with increasing excellence, be it therefore

RESOLVED, That expressions of appreciation are tendered to David F. Lorms, Vice-President for Classroom Teachers, and his committee for their contribution in the conduct and promotion of this program, be it further

RESOLVED, That appreciation is expressed to the officers and members of state associations who have participated in the teacher recognition program.

A-78-5 Appreciation to the Executive Board

WHEREAS, John E. Bonfadini, Vice-President for Industrial Arts Supervisors, Arthur L. Robb, Vice-President for Classroom Teachers; M. James Bensen, Vice-President for State Association Officers; David L. Jelden, Vice-President for Teacher Educators; William A. Downs, Vice-President for Elementary School Industrial Arts; Jacqueline Colli, President for College Students; Willis E. Ray, President-Elect; Billy W. Hayes, Sr., President, and Lee D. Carter, Immediate Past President, have all given liberally of their time and talents in providing outstanding leadership and service, and,

WHEREAS, The Association has made exemplary progress under the leadership of these Executive Board members, be it therefore

RESOLVED, That the Association expresses its fullest appreciation to them.

A-78-6 Appreciation to the Governor of the State of Georgia

WHEREAS, His support for industrial arts contributed to the success of the Conference held in Atlanta, Georgia, be it therefore

RESOLVED, That the Association expresses its appreciation to Governor George Busbee for his assistance in making this Conference a success.

A-78-7 Appreciation to the Mayor of Atlanta

WHEREAS, He assisted in promoting Atlanta as the site of the 1978 AIAA Conference and he has supported the operation of the Conference, be it therefore

RESOLVED, That appreciation be extended to Maynard Jackson, Mayor of Atlanta, for his contributions to the success of the Conference.

A-78-8 Appreciation to Personnel of the Georgia Industrial Arts Association

WHEREAS, Robert Stewart, President, Georgia Industrial Arts Association, and members of the Association co-hosting the Fortieth Annual Industrial Arts Association Conference, have contributed to its success, be it therefore

RESOLVED, That the Association, through its Executive Board and membership, expresses its sincere appreciation.

A-78-9 Appreciation to Education Personnel

WHEREAS, The success of the Fortieth Annual Conference rests in large measure on the devotion and contributions of the personnel of public schools, collegiate institutions, and state associations, be it therefore

RESOLVED, That the membership of the AIAA through its Executive Board expresses thanks and appreciation to all individuals and groups who contributed to the success of the Conference and particularly to those individuals and groups from the state of Georgia for their significant support of the Conference.

A-78-10 Appreciation to the Public Schools

WHEREAS, The success of the 1978 Conference was insured by the fullest cooperation of Dr. Charles McDaniel, Superintendent of Schools, and his staff be it therefore

RESOLVED, That the officers and members of the American Industrial Arts Association express gratitude for their assistance.

A-78-11 Appreciation to the National Office

WHEREAS, The role of the national office of the Association is vital to the effectiveness of service to members of the Association, be it therefore

A-78-11 Appreciation to the National Office (Continued)

RESOLVED, That appreciation by the membership and the Executive Board is herein expressed to the national office staff.

STANDING RESOLUTIONS:

S-78-1 The AIAA believes that excellence in teaching is the foundation of a good educational system. The Association, therefore, recommends that only persons who have a minimum of a bachelor's degree with thirty semester hours (or equivalent) of course work in industrial arts and a valid teaching certificate in industrial arts, be permitted to teach industrial arts.

S-78-2 The AIAA believes that an industrial arts program offers one of the best educational opportunities that can be used to help young people grow to the maximum of their individual abilities; therefore, the Association further believes that a program of industrial arts should be offered in all elementary, middle, and secondary schools in the nation.

S-78-3 The AIAA believes that program and institution accreditation assures the continued development of quality programs of education. To this end the AIAA encourages its committees and member councils to formulate accreditation and/or to update standards for all programs of industrial arts conducted in elementary, middle, and secondary schools; and colleges and universities. The standards should be designed to promote improvement through self-evaluation as well as provide criteria used by accreditation agencies.

S-78-4 The AIAA believes that a maximum effort should be extended in soliciting membership for and continuing the development of the industrial arts student clubs at all levels.

S-78-5 The AIAA believes that all persons, regardless of race, creed, color, or sex, should be given the opportunity to participate in the programs of industrial arts in the schools of all nations.

S-78-6 The AIAA believes in and continues to support the transition to the international system (SI) of measurement, and encourages all of its members to include instruction on the modernising metric system in their classes.

AIAA RESOLUTIONS
ATLANTA, GEORGIA 1978

ATTACHMENT A

S-78-7 The AIAA believes that all educators and all professional associations should work together in the education of the youth of our schools to better prepare them for an ever-changing technological society.

S-78-8 The AIAA believes that a maximum effort should be extended in the business-industry-education partnership for the purposes of keeping that segment of the society informed of the contribution of industrial arts to the youth of our nation.

S-78-9 The AIAA believes in and supports the efforts of the International Relations Committee in strengthening the industrial arts associations and programs in all nations of the world.

CURRENT RESOLUTIONS:

C-78-1 Establishment of a National Industrial Arts Education Week — PASSED

WHEREAS, the Executive Board of the American Industrial Arts Association has received and reviewed the report and recommendations of the Public and Professional Relations Committee and approved the concept of a National Industrial Arts Education Week, be it therefore,

RESOLVED, that a sub-committee of the Public and Professional Relations Committee in cooperation with the National Office, be charged with the responsibility for preparing and disseminating information for an Annual National Industrial Arts Education Week, and be it further

RESOLVED, that the AIAA House of Delegates approve the concept of a National Industrial Arts Education Week and establish the second week of November as National Industrial Arts Education Week. Be it further resolved that for the 1979 National Industrial Arts Education Week the theme be "Industrial Arts: Preparation for Life in a Technological World".

Franklyn C. Ingram, Chairperson
Public and Professional Relations
Committee

C-78-2 Support for Efforts of Minnesota Industrial Arts Association

WHEREAS, Industrial Arts programs have a clearly defined body of content and role to play in the total educational system, and

WHEREAS, Industrial Arts serves the career developmental needs of all students in the school system and

230

ATTACHMENT A

C-78-2 Support for Efforts of Minnesota IA Association (Continued) PASSED

WHEREAS, Industrial Arts fulfills broad purposes of general education programs for youth, and

WHEREAS, the Vocational Education Amendments of 1976 and Federal regulations which identify Industrial Arts by name, definition and extent of eligibility for funding, be it therefore

RESOLVED, that the American Industrial Arts Association fully supports the Minnesota Industrial Arts Association in: (1) retaining the name of Industrial Arts to identify the field of study and (2) opposing work experience as a requirement for certification of Industrial Arts teachers.

Ad Hoc Committee to study the
Minnesota Problem
Dr. Alvin E. Rudisill, Chairperson
Co-sponsor, Minnesota Industrial
Arts Association

C-78-3 Support of Appropriation for the Career Education Implementation Incentive Act of 1977 (PL 95-207) PASSED

WHEREAS, the AIAA has played an active role in the support, development, and passage of the Career Education Implementation Incentive Act of 1977, and

WHEREAS, the AIAA has developed a position paper and submitted testimony outlining its role and responsibilities in career education, and

WHEREAS, The career education appropriations have the potential to facilitate the refinement and implementation of many industrial arts goals including increasing the occupational awareness and technological literacy of our youth, be it therefore

RESOLVED, that the AIAA continue its efforts to insure full funding to fully implement the intent of the Career Education Implementation Incentive Act of 1977.

James E. Good/Kendall N. Starkweather
AIAA Legislative Committee
(Submitted on behalf of the Committee)

ATTACHMENT A

C-78-5 Conference Study Committee

DEFEATED
(as amended)

WHEREAS, the Public School Classroom Teacher makes up a large segment of AIAA membership and potential membership, and

WHEREAS, the hardship of released time, inadequate substitutes, and school policy requires many members and potential members to miss the Annual Conference, and

WHEREAS, more involvement by the membership will build the strength of the Association as well as the attendance to the Conference, therefore be it

RESOLVED, that the President of AIAA appoint a special Ad Hoc Committee to study the feasibility of holding the Annual Conference during the summer months, and be it further

RESOLVED, this study include input from the entire membership via a national survey as well as a survey of the exhibitors, and be it further

RESOLVED, this Ad Hoc Committee report the results of the study to this representative assembly at the next Annual Conference.

Ronald Foy, Representative
Texas Industrial Arts Association

C-78-6 Support of the Industrial Arts Supervisor from Nebraska

PASSED

WHEREAS, the Nebraska Industrial Education Association has voted unanimously to support addition of a full-time State Supervisor for Industrial Arts in the Nebraska State Department of Education, and

WHEREAS, such a full-time State level position will contribute significantly to the continual development and improvement of Industrial Arts throughout Nebraska, be it therefore

RESOLVED, that the House of Delegates of the American Industrial Arts Association fully supports the efforts of the Nebraska Industrial Education Association in obtaining a full-time State level Supervisor for Industrial Arts in Nebraska.

Nebraska Industrial Education Association
Marion E. Childress, Secretary-Treasurer
1977-78

ATTACHMENT A

C-78-7 Support of the Industrial Arts Supervisor Position from Michigan — PASSED

WHEREAS, the Michigan Industrial Education Society has voted unanimously to support addition of a full-time State Supervisor for Industrial Arts in the Michigan State Department of Education and

WHEREAS, such a full-time State level position will contribute significantly to the continual development and improvement of Industrial Arts throughout Michigan, be it therefore

RESOLVED, that the House of Delegates of the American Industrial Arts Association fully supports the efforts of the Michigan Industrial Education Society in obtaining a full-time State level Supervisor for Industrial Arts in Michigan.

Leonard Fritz, President (1977-78)
Michigan Industrial Education Society

C-78-8 Support of Industrial Arts Consultant Position from Minnesota — PASSED

WHEREAS, the Minnesota Industrial Arts Association has indicated support for a full-time State Consultant for Industrial Arts in the Minnesota State Department of Education, and

WHEREAS, such a full-time State level position will contribute significantly to the continual development and improvement of Industrial Arts throughout Minnesota, be it therefore

RESOLVED, that the House of Delegates of the American Industrial Arts Association fully supports the efforts of the Minnesota Industrial Arts Association in obtaining a full-time State level Consultant for Industrial Arts in Minnesota.

Dennis Olson, Executive Secretary
Minnesota Industrial Arts Association

C-78-9 Support of the Industrial Arts Supervisor Position from South Dakota — PASSED

WHEREAS, the South Dakota Industrial Education Association has voted unanimously to support addition of a full-time State Supervisor for Industrial Arts in the South Dakota State Department of Elementary and Secondary Education, and

WHEREAS, such a full-time State level position will contribute significantly to the continual development and improvement of Industrial Arts throughout South Dakota, be it therefore

ATTACHMENT A

C-78-9 Support of the IA Supervisor Position from South Dakota (Continued)

RESOLVED, that the House of Delegates of the American Industrial Arts Association fully supports the efforts of the South Dakota Industrial Education Association in obtaining a full-time State level Supervisor for Industrial Arts in South Dakota.

Marvin C. Burroughs
South Dakota Industrial Education Association

C-78-10 Support of the Industrial Arts Supervisor Position from Montana PASSED

WHEREAS, the Montana Industrial Education Association has voted to support addition of a full-time State Supervisor for Industrial Arts in the Montana Office of Public Instruction, and

WHEREAS, such a full-time State level position will contribute significantly to the continual development and improvement of Industrial Arts throughout Montana, be it therefore

RESOLVED, that the House of Delegates of the American Industrial Arts Association fully supports the efforts of the Montana Industrial Education Association in obtaining a full-time State level Supervisor for Industrial Arts in Montana.

Jeff Wulf, Executive Secretary
Montana Industrial Education Association
Montana Delegate

C-78-11 Support of Full-Time State Level Industrial Arts Supervisors PASSED

WHEREAS, some states do not employ full-time State Supervisors for Industrial Arts, be it therefore

RESOLVED, that the AIAA develop and distribute a position paper supporting the efforts of affiliated State Associations in working toward establishing full-time Industrial Arts Supervisor positions in every state.

Jeff Wulf, Executive Secretary
Montana Industrial Education Association
AIAA 1978 Montana Delegate

AMERICAN INDUSTRIAL ARTS ASSOCIATION
1977-78
PRESIDENT'S REPORT
Billy W. Hayes, Sr.

Working with the fine members of the AIAA Executive Board as your President this past year has been one of the greatest experiences of my professional career. I thank you for the honor you bestowed on me by electing me President. Through this office I have had the pleasure of working with professional educators all over the United States and Canada. It is a shame that all industrial arts people cannot experience being President of AIAA for at least one term. It is enlightening in many ways, both professionally and academically. The visits I have made to various conferences and state association meetings have been educational and pleasant; and in return, I have done my best to promote AIAA membership and to represent the Association.

This year, 1977-78, more than any other year in my professional career, will be cherished and fondly remembered as time passes. I want to thank the membership for this opportunity to serve. It is my plan to retire from the profession at the end of next school year, but I still will be very interested in AIAA and the industrial arts profession, so I request your help in keeping in touch.

AIAA Executive Director

Our Executive Director, Don Rathbun, has done an excellent job for our Association. He has improved our financial documentation and initiated several innovations that permit us to better see the overall fiscal workings of the AIAA. He has operated the national office well in spite of being short-staffed. This condition of understaffing has concerned me greatly. All correspondence, etc., has been taken care of most satisfactorily; but being short of staff, temporarily, has caused some problems of delay. We hope you haven't been inconvenienced. The Board felt it more prudent to cut back as opposed to extensive deficit spending. With the dues increase approved by the membership, our decreasing financial responsibility for AIASA, increased advertising in MST, profitable conferences, and increased membership, AIAA should be in a better position to improve services to members without experiencing year-end deficits. Please be patient with our AIAA operations as we get things back into good balance and staff size and services back to normalcy.

The Executive Director has provided leadership for the Association and the profession by arranging and/or participating in over fifty meetings in Washington during the year. Many of these have been in connection with AIAA's extremely successful legislative efforts involving the Legislative Committee. Other meetings have been with various officials within the USOE about such things as: industrial arts research, data collection on IA enrollments, development of rules and regulations for legislation of interest to industrial arts education, and program titles.

For over four years Mr. Rathbun has actively pursued support for the recognition of AIASA as an official vocational youth organization by USOE. On February 1, 1978, Dr. Mary Berry, Assistant Secretary for Education, signed a policy statement making the recognition official. This is certainly another in what we hope to be a long series of milestones for AIASA. Perhaps I should mention here also that the House of Delegates of the American Vocational Association designated AIASA as the official industrial arts student organization at their December 1977 convention. This is another example of the cooperation and support manifest by the industrial arts division of AVA and of AVA at large.

The future looks good for AIASA, due to the hard work and leadership of Ron Applegate, a receptive and knowledgeable Board which approved the reorganization, and to our Executive Director, who took the initiative to create within the national office a part-time Director of Student Organizations position, and to a climate in which change, development, and an understanding guidance prevails.

AIAA Director of Student Organizations

Ron Applegate has done a beautiful job with the AIASA organization. AIASA incorporated this past year; their dues structure was raised to offset the cost of their operations; and in three years AIASA will be completely self-sufficient. Although membership has remained stable this past year, a good foundation was laid for future growth and improved organization. Next year AIASA will meet in June, as most national student organizations do, to hold their national meeting outside the regular school year.

AIACSA, our college student organization, has been turned over to the AIAA national office. Director of Student Organizations Applegate will initiate a reorganization during FY 79 to establish chapters under a dues structure in addition to AIAA college student dues. In order for a college student to belong to a college chapter affiliated with AIACSA, he/she must also hold a valid college student AIAA membership which is one-half the regular member's dues. Ten members are required to organize a club on the college campus. Only dues from the club membership will be used to make up the budget for the operation of this organization.

AIAA Executive Board Members 1977-78

Billy W. Hayes, Sr., President
Willis E. Ray, President Elect
Lee D. Carter, Past President
David Lorms, Vice President for Classroom Teachers #1
Arthur L. Robb, Vice President for Classroom Teachers #2
Dave L. Jelden, Vice President for Teacher Educators
John Bonfadini, Vice President for Supervisors
William A. Downs, Vice President for Elementary Industrial Arts
James Benson, Vice President for State Association Officers
Jacqueline Colli, Vice President for College Students
Donald L. Rathbun, Executive Director of AIAA

During the year the Executive Board convened three times: New Orleans, Louisiana, April 8, 1977; Washington, D. C., November 11-14, 1977; and Atlanta, Georgia, February 26-27, 1978. As President, I made the customary inspection visit to the national office in June. It was a real eye-opener to learn first hand about the complexity of operating a national organization. Officers seldom have the time or the opportunity to do much other than deal with policy and matters of finance. A deeper respect and appreciation was developed toward our dedicated and knowledgeable staff. Our Administrative Committee composed of the President, Past President, and President Elect met with the Executive Director in Washington, D. C., September 9-12, 1977.

Goals and Aims for 1977-78

I presented the following goals and objectives at the House of Delegates meeting in New Orleans, Louisiana, to be pursued by the Association during the year of my administration:

1. Increase AIAA membership
2. Involve more classroom teachers in committee work
3. Increase student membership and more involvement of AIAA with student clubs
4. Pursue the establishment of an industrial arts week nationally.

Recommendations were made at the New Orleans Executive Board meeting to implement steps to accomplish the goals and objectives set up. In regular Executive Board meetings business was handled routinely. All of the goals and objectives were not accomplished to the degree I desired. Our financial limitations which seemed to require most of the discussion time at these meetings kept us from pursuing many other concerns, but this condition has been prevalent for many years. The following items were finalized by your Executive Board:

1. A metric "500" model dragster design and race was sanctioned by the Board to be operated by the Contests and Special Events Committee.

2. The 1979 San Antonio Conference Planning Committee was allotted $2,500 to plan and conduct the conference.

3. AIASA, the American Industrial Arts Student Association, was reorganized and incorporated as a separate organization.

4. By a vote of the membership, a dues increase to $30 per year was approved to be implemented after the Atlanta, Georgia conference.

5. An ad hoc committee was set up to study resolution C-77-1 as asked by the Minnesota group. The committee was chaired by Alvin E. Rudisill.

6. The 1983 conference site will be selected from the North Central portion of the United States bounded roughly by Minneapolis, Detroit, and Kansas City.

7. AIAA published materials were evaluated by the Publications Committee and outdated and surplus materials were discarded, thus greatly reducing inventory and eliminating storage costs.

8. The William E. Warner Monograph Review Committee was appointed and chaired by first recipient, Kenneth W. Brown.

9. A membership plan of action designed by the Executive Director was approved for implementation by the Membership Committee.

10. A dues incentive plan was approved to rebate 10% back to the states provided the dues increase proposal passed.

11. In an attempt to further demonstrate fiscal responsibility, an earlier approved study was finalized and conducted to determine savings if any which might accrue to AIAA if the national office was moved.

AIAA Administrative Committee Meeting, Washington, D. C., September 9-12, 1977

1. Lee Carter was directed to update the policies and procedures handbook for AIAA Board usage.

2. A request by the Executive Director to hire Ms. Sally Scrimgeour as part-time advertising manager for the MST was approved.

3. A grant of $8,089 obtained by the Executive Director from the Office of Career Education, USOE, was accepted. The grant is for a study of Utah's career education program.

4. Format and procedures for submitting resolutions were formalized and directed to be printed in the MST as information for the membership.

5. One free association membership per commercial exhibitor was sanctioned as a gesture of appreciation for their support.

6. The Resolutions Committee was given the additional duty to monitor all activities pertaining to submitting and amending resolutions to insure that they are printed for the membership exactly as approved by the delegates.

7. An evaluation of the Executive Director and the management of Association operations was conducted. The findings were outstandingly complimentary.

President Elect, Willis E. Ray, has done a fantastic job of coordinating and guiding the committee activities this past year. His exceptionally well done committee handbook was distributed to the committee chairpersons Monday. A "Committee-Gram" was published by Ray periodically throughout the year which reported the many projects and activities of each committee.

Several ad hoc committees were formed and are working on tasks assigned them. These include:

1. Relocation of the national office--Herbert Bell, Chairperson
2. Developing guidelines for organizing and funding a National Industrial Arts Advisory Council--Dale Lemons, Chairperson
3. A study of state association affiliation benefits and procedures--Joe Logston, Chairperson
4. William E. Warner Monograph Review Committee--Ken Brown, Chairperson

Communications

The major item of concern in any organization is communication. This past year Lee Carter started the "Past President's Communique" which gave the Board yet another media for communicating and disseminating pertinent information. Along with the "AIAA Committee-Gram" and the "AIAA Executive Board Communique", this news source keeps all alerted to Association items of importance.

Executive Board Minutes

The AIAA Executive Board meeting minutes for the past year may be reviewed in the AIAA conference office or in the national office in Washington, D. C. Contact Executive Director Rathbun if you are interested in detail greater than that appearing in this report.

Summation

This past year has been busy yet rewarding for me and the AIAA Executive Board. We have progressed toward achieving goals and objectives set up by your President and supported by your Board. There has been an escalation of student/AIAA concerns, an increase in membership through the efforts of Membership Chairperson Gene Martin and Executive Director Don Rathbun, AIASA has turned the corner toward self-sufficiency, AIACSA has blossomed under its President, Jacqueline Colli. Hopefully, all things will run smoothly for your President Elect, Willis E. Ray this coming year. Although I will retire after this coming school year, I will always cherish the friendships built up during my tenure in office. I will also be very interested in seeing AIAA and the

student organizations grow into viable organizations sufficiently strong with expertise for leadership in all matters of the industrial arts profession, especially where legislation for education is concerned. We've come a long way. We so rightly deserve the long sought position of prominence within the core of American curricula.

May God bless each of you who have worked for the betterment of your professional association, the American Industrial Arts Association. Know that it is not in vain.

Thank you,

Billy W. Mayes, Sr.

Billy W. Mayes, Sr.
AIAA President 1977-78

240

Committee Chairpersons

ACCREDITATION, Louis J. Pardini
ADMINISTRATIVE, Billy W. Mayes, Sr.
AFFILIATION, Joe R. Logsdon
BALLOT COUNTING, Donald L. Rathbun
COLLEGE CLUBS (AIACSA), William E. West
CONFERENCE, Donald P. Lauda
CONTESTS AND SPECIAL EVENTS, P. Jos. Posch
CREDENTIALS, M. Roger Betts
CURRICULUM, Lee H. Smalley
ENVIRONMENTAL EDUCATION, Daniel L. Householder
HIGH SCHOOL CLUBS (AIASA), William P. Elrod
HISTORY AND ARCHIVES, George H. Ditlow
INTERNATIONAL RELATIONS, A. A. "Scotty" Day
LEGISLATIVE, James E. Good
LIAISON AIAA-AVA, Frederick D. Kagy
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TEACHER RECOGNITION, David P. Lorms
WOMEN AND MINORITIES, Denise Helene Keller

241

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ALABAMA
Charles F. Tate

ALASKA
Ray Minge

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Louis Pardini

ARKANSAS
V. N. Hukill

CALIFORNIA
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DELAWARE
William R. Simpson

DISTRICT OF COLUMBIA
Hurley Fisher

FLORIDA
James W. McAlister

GEORGIA
Samuel L. Powell

HAWAII
LeRoy Ching

IDAHO
Irving L. Stiber

ILLINOIS
Carl A. York

INDIANA
Frank Haynes

IOWA
Paul Franklin

KANSAS
Noel O. Mintz

KENTUCKY
Emory J. Gates

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Alden R. Colby

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James H. Bruns

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NEW MEXICO
Robert D. Nesbitt

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NORTH CAROLINA
William S. Scarborough

NORTH DAKOTA
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Charles E. Earhart

OKLAHOMA
James F. Griffin

OREGON
Earl E. Smith

PENNSYLVANIA
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Nicasio Cruz

RHODE ISLAND
Paul P. Clark

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Harvey E. Morgan

SOUTH DAKOTA
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TEXAS
Ronald Foy

UTAH
Ross Hilton

VERMONT
George H. Agnew

VIRGINIA
Chester R. Lane

WASHINGTON
Raymond Glew

WEST VIRGINIA
Keeling Lewis Fife

WISCONSIN
Tom Baldwin

WYOMING
Charles Burke

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John Ross

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Carl McLeskey

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Vance Synder

EEA-SHIP REPRESENTATIVE
Thomas Rogers

DECK OFFICER
Fred Curry

AUTHOR INDEX

AUTHOR INDEX

A

Abraham, Lee
Amatrudi, Gloria
Anderson, Rodney
Andrews, Wayne D.
Atkins, Michael B.

B

Bakamis, William A.
Ballard, Samuel
Bame, E. Allen
Barella, Richard
Bedics, Joseph J.
Bell, Claude A.
Bell, Richard
Bender, Myron
Bennett, Madonna
Benson, M. James
Bohr, Charles W.
Bonfadini, John E.
Brook, R. Dan
Buffer, James J. Jr.
Bukhary, Abdullah H.
Byle, Arvon D.

C

Campbell, Clifton P.
Campbell, Harry L.
Carpenter, Joseph E.
Cecere, Joseph J.
Chang, Tien-Jin (Frank)
Cole, Samuel L.
Crouch, J. Page

D

Dahl, Richard J.
Denning, Merle A.
DePue, David L.
DiPaul, H. Bert
Dorner, Robert F.
Drake, Dennis Q.
Dugger, William E., Jr.
Dye, Wandel L.

F

Fales, James F.
Fox, Fred E.

G

Gallagher, Jerry
Gilbert, Harold G.
Gill, John
Gloeckner, G.
Gore, David K.
Greenwald, Martin
Grover, Jerry

H

Hales, James
Haynie, W. J., III
Henak, Richard
Henderson, Gary
Herbert, George R.
Hinckley, Edwin C.
Hirsch, Dennis
Hostetter, Robert G.
Hughes, Thomas A., Jr.
Huth, Mark W.

I

Israel, Everett N.

J

James, Clyde "Jack", Jr.
Jones, Ronald E.
Joyner, David I.

K

Keep, Roger L.
King, Charles B.
Koble, Ronald L.
Kozak, Michael R.
Kruppa, Richard A.

L

Larson, C. Victor
Lavender, John
Leeper, H. Terry
Lindbeck, John R.
Lintereur, Gary E.
Liu, Cheng C.
Loepp, Franzie L.
Lorms, David P.
Lovedahl, Gerald G.
Lux, Donald G.

M

Maley, Donald
Manchester, John M.
Martin, G. Eugene
McKell, William E.

Mohan, David
Morrisey, Thomas J.

O

O'Bannon, James E.

P

Pardini, Louis J.
Patrick, Dale R.
Peterson, Richard E.
Phillips, Richard I.
Polette, Douglas L.

R

Ressler, Ralph
Rinkenberger, Marson
Ritz, John M.
Ryerson, D. Thomas

S

Sarapin, Marvin I.
Schwaller, Anthony E.
Shemick, John
Shepard, Don W.
Sherrell, Eugene C.
Sinn, John W.
Smalley, Lee H.
Smeltz, B.
Smith, Donald F.
Smith, Earl E.
Starkweather, Kendall N.
Starley, LaVoy
Steele, Gerald L.
Streichler, Jerry

T

Taglavore, Anthony
Thompson, William R.
Trocki, Frank R.

W

Walencik, Vincent J.
Weber, Robert D.
Weede, Gary
Wenig, Robert E.
Wescott, Jack W.
Wright, Thomas

Y

Yuill, Ronald D.